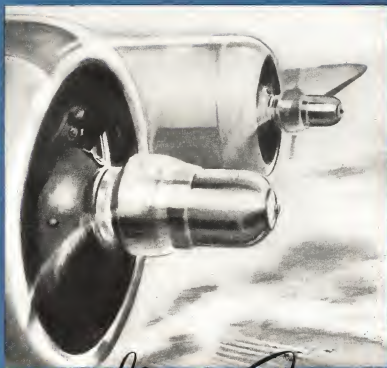


AVIATION WEEK

JULY 21, 1947

INCORPORATING AVIATION AND AVIATION NEWS

A MCGRAW-HILL PUBLICATION



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keeps cockpit windows
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a thin transparent film of electrically conductive material over its entire area. This source uniform heating of each window and prevents optical distortions which sometimes occur in systems using embedded wires or concentrated heat sources. And because Westinghouse furnishes all of the electrical equipment for this new system, you gain the advantage of their responsibility backed by vast research and engineering facilities devoted to aircraft.

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ESTABLISHED 1902



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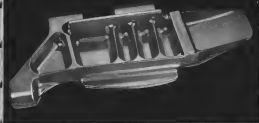


Latest addition to the famous fleet of Eastern Air Lines is the giant New-Type Constellation—world's fastest, most powerful airliner. This great plane is designed not only for luxurious air travel at its best, but for the most reliable performance, the most dependable service.

U. S. Royal Aircraft Tires, too, are designed and built to match the flawless performance of the modern planes they serve. And as American aviation continues to add new luster to its name, "U. S." keeps pace by developing lighter, stronger U. S. Royals for huge Constellations and private planes alike.

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Typical of many Wyman-Gordon developments is this complicated light alloy forging used in the wing structure of one of Uncle Sam's latest fighting planes.

Modern transportation on the ground and in the air requires the maximum use of forgings. For greatest strength with minimum weight and uniformity of quality no other method of forming metal competes with the forging process.

Are you taking full advantage of the constantly growing range of forgings? Wyman-Gordon forgings all the way from five up to one thousand pounds.

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Forgings of Aluminum, Magnesium, Steel

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DETROIT, MICHIGAN

THE AVIATION WEEK

MANUFACTURERS WATCH THE HILL—Attention of heavy aircraft manufacturers late last week was turned on Capitol Hill.

Unification still looked certain.

Two proposals affecting procurement policies— repeal of some parts of the Vanden Bremer Act, and the General Procurement Bill, were in the "U" stage.

So were several measures concerned with research.

There is no general opposition. The fight is against the clock.

As to appropriations, the industry knows where it stands: more funds available this fiscal year than last for both Army and Navy aircraft.

Problems will be to get it spent fast enough. Douglas, long an industry leader, reported a dwindling backlog at the end of the first half of its fiscal year. Its shipments outstrip orders by some \$35,000,000.

This may be the harbinger of the shrinking transport market. Military business can't take up the slack. Increased contract authorizations for both Army and Navy mean new orders for military transports, as well as new and fantastic flights.

BOGGED DOWN IN SAFETY—The week dragged on with few constructive accomplishments in the drive for safer air travel. A non-scheduled airline's Florida crash with a DC-3 made another batch of headlines but it hid the shock that a certificated airline accident always brings.

The director of CAB's Safety Bureau stepped out after only a few months' service. No one was surprised. The accident investigation authority granted by law to CAA and CAB has been secured by the President's Air Safety Board. This has demoralized the regular accident investigation staffs. The new board is defense and prosecuting attorneys, judge and jury all.

Meanwhile, the Eastern and Western accidents are still mysterious. According to the engineers they couldn't have happened. Don't expect early reports on either.

Congress claims it wants safer air travel and drops off funds for safe air industry, the Service and CAA can get together. Chances of anyone getting anything CAA is likely to move against this. The CAA mentality espoused by Charles Stinson, top bureaucrat of the old post, is coming out on top again. CAA is so far behind the program in technical know-how and development that it's huge. Everyone says so—Army, Navy, airlines, instrument manufacturers, aircraft producers.

Additional complaints on CAA came from Capitol Hill. The Harshaw report indicated Congress would turn thumbs down on CAA's pre-war VVIP equipment,

and would approve only equipment based on older applications. These CAA has consistently opposed.

AIR POLICY BILL—In the manufacturing industry's viewpoint, one of the most encouraging actions of Congress to date was the reporting out by Senate Interstate and Foreign Commerce committee of the bill establishing an air policy board. If enacted, this might be more important in the long run than increased procurement funds just made available by Congress.

In such, the Policy Board—and its recommendations—would solve nothing. But the logical outcome of the Board's investigation would be a recommendation for a national air policy—in effect, a long range procurement program. Although even this long range program, if eventually adopted, would be subject each year to the warring of the appropriations committees' opinions, it is possible to see spelled out a national policy that it could be used as a planning instrument by the Air Force, and a talking point in seeking appropriations each year.

RESIGNATION RUMORS—Pecking of reports that CAB members will resign in the near or distant future has become a popular, fairly safe bet. Thus, despite denials of Chairman Leland and members Young. The \$10,000 salary limitation on CAB jobs has been an important factor in the departure of a number of top Board personnel in the past two years. The odds are always in favor of more resignations—sooner or later.

Generally unshared is the fact that several other CAB officials are receiving almost the same salary as CAB members themselves.

In Leland's case, the denial of departure in the second or recent weeks. Young pointed out that if he were planning to resign shortly he would have conferred with Mr. Truman on the subject. He hasn't done so.

STYMIED BELOW THE BORDER—Trouble is brewing for U. S. Air Transport in Latin America. The belated agreement with Argentina late May, hailed as a great U. S. victory for principles of free competition, apparently is being held behind the scenes in Argentina.

The U. S. is still unable to get entry into Mexico for Boeing, Eastern and Western, who were certificated for routes in CAB's Latin American decision well over a year ago. Meanwhile, see flag carriers are beginning to feel the pinch of stiffer competition from Latin American lines and will soon be complaining loudly.



THE "BUSINESS END" OF THE LOCKHEED P-80 IS INSULATED WITH



The new Reerax Lockheed P-80 Shooting Star may well claim the distinction of being America's first jet plane to achieve mass production status.

We are proud that Reerax, our 2000" Z silica fiber low weight insulation is now regular equipment on the tail pipe of this great plane.

Reerax blankets completely protected by us are used only the stainless steel tailpipes as they come off the production line at Sater Aircraft Company's San Diego plant and the assembly is delivered to Lockheed ready to install.

Reerax is available in bare, cloth, slotted, ribbed or covered or in prefabricated blankets to specifications.

WRITE...

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NEWS DIGEST

DOMESTIC

Edward G. Lorber, vice president and treasurer of Capital Airlines (PCA), was named vice president and controller of the company's quarter's board of directors meeting. He will have complete supervision of all corporate expenditures. J. C. Bristol, Alexandria, Va., was elected to the board and Bryant and D. P. Ginnelago of Minneapolis were named members of the executive committee. R. F. Wright, PCA's assistant treasurer, located acting treasurer Southern Airways, Birmingham, Ala., has made its first award, flight over part of the 1,949 miles of faculty routes granted by CAA in April. Frank H. Hahn, president, states regular service will begin "within the next several weeks."

Sam Chas. Cheney (R., S. D.), chairman of the Armed Services Committee, declared the Air Force need 7,000 planes a year as replacements in a 15,000 plane force.

William A. Link, executive of the pre-flight and instrument branch, and president of Link Aviation, Inc., was awarded the Walter Field Gold Medal of the Royal Aeronautical Society of Great Britain.

New Shasta aircraft design for use as mail plane through San Francisco for Pacific and Alaska routes will be issued July 10. Also in color, it will depict plane flying above the San Francisco-Oakland bridge.

Northwestern, manufacturer of cargo carrier, has announced plans to build a freight depot at Los Angeles Municipal Airport.

FINANCIAL

General Electric Co.'s net earnings rose 577,997,000, up 47 percent over the first half of 1946, part of which time the company was under bond.

Minneapolis-St. Paul's Republic Co.'s wage increase to feature engine on 12 cents an hour, more than the 20 cents reported last week. This, with a rise of 10 cents granted in March, makes a total of 32 cents an hour increase.

FOREIGN

Agreement to International Civil Aviation Convention, covering the routes of Spain from ICAO has been sent to the Senate for ratification.

Canada and Sweden have entered into an air service agreement covering a route between Montreal and Stockholm via intermediate points.

South African government has bought two Douglas DC-3C executive transports. The long-range transport carries eight DC-3C.

Italy has shipped nine Fiat planes to the Argentine Airline Department.

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With South Bend Precision Lathes, everything is possible. The heavy, balanced lathe is made for service work, for the machine shop, for the tool and die shop. A South Bend lathe can do the most useful work in your shop.

Revised Catalog (200) describes 17" to 36" swing lathes. Contact local distributor for information on prices, delivery and close-up pictures. Prices start at \$440. The average price increase is less than 10% over previous list.

South Bend Lathe Models
Refined new lathe line: 17", 20", 24", 30", 36" and 48" swing.



"HOW TO RUN A LATHE"

Could be made an excellent and useful addition to your library. 100 pages (12 1/2" x 9 1/2") 10¢.

SOUTH BEND Lathes

CLEAN RUNWAYS NEXT WINTER may depend on your action **TODAY!**



ORDER YOUR WALTER SNOW FIGHTERS

Now!



Advantages of WALTER SNOW FIGHTERS

- 1. No slipping, skidding or wheel spinning, because the exclusive A-Past Positive Drive delivers power to each of four driving wheels according to its load on any road.
- 2. Clear 20 feet width in one run, clear at speeds up to 30 mph; clear more in the side walking without skidding, back through deepest drifts.
- 3. Models from 125 to 340 hp., available with correctly designed offset Valmet, snow-thrower, spreader, or other equipment, used and chemical spreaders according to needs.

If your plans call for additional snow removal equipment this coming winter, we make the following suggestions:

1. Get the facts on Walter Snow Fighters from your Walter distributor, or by writing us. Study the many exclusive Walter features. Consider their outstanding record of snow clearance throughout the snow belt.
2. Place your order early, to insure readiness by snow-time. Walter Snow Fighters are carefully engineered, highly specialized equipment that can not be hastily manufactured nor delivered on short notice.

Let us schedule your order now. Be ready for the first—and worst—snows next winter. See your Walter distributor or write us for literature.

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WALTER SNOW FIGHTERS



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... to meet the high degree of accuracy, tensile and other structural requirements of the aviation industry. Many and more of the "Unbrako" Intersect Wrenching Bolt (AI), the "Unbrako" 180° Flush Head Socket Bolt (II) and the "Unbrako" Intersect Wrenching Lock Nut (LN)—an officially approved safety nut—are being specified by engineers and aircraft designers because they are strong, accurate and because their unusual wrenching feature facilitates compact designs that saving material, weight and space.

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<p>"UNBRAKO" SOCKET SET SCREW WITH RIBBED CUP POINT</p> <p>See special top view of this screw. It is a cup point screw with a ribbed cup point. It is made of steel and is available in sizes from 1/8" to 1/2". It is used for clamping and securing parts.</p> <p>Put it and check Point</p>	<p>"UNBRAKO" SOCKET SET SCREW WITH UNFURRED THREADS</p> <p>Put it and check Point</p>	<p>"UNBRAKO" RIBBED SOCKET HEAD CAP SCREW</p> <p>Put it and check Point</p>	<p>"HALLOWELL" KEY KIT</p> <p>Put it and check Point</p>	<p>"FLELOC" SELF-LOCKING NUTS</p> <p>Put it and check Point</p>
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VOL. 47 • NO. 2

AVIATION WEEK

JULY 21, 1947

INCORPORATING AVIATION AND AVIATION NEWS

New AAF Jet-Rocket Fighters Designed for Supersonic Speeds

Swept back wings and dual type power plants feature new high speed program for combat planes

New AAF Fighters, designed for twist and turn maneuvers, could speed, are scheduled to fly before the end of the year. The new fighters are based on the principle of the swept wing suited to the turbojet engine with a program spreading of rocket motors in booster units. The new planes and structural performance:

- McDonnell XP 58, more than 650 mph.
- North American XP 56B, more than 650 mph.
- Curtiss XP 57, about 650 mph.
- McDonnell XP 55, over 700 mph.
- Northrop XP 59, more than 550 mph.
- Lockheed XP 59, supersonic.
- Republic XP 59, supersonic.
- Convair XP 59, supersonic.

Threatening to outstrip present business aircraft is the new fighters may outstrip the Bell X-1 and X-2 and the Douglas D-558 before the business fight aircraft program is fully started. Evidence that the AAF cannot afford to wait for the business aircraft program is a view of current strategic planning before a cost based on the decision to build and fly these aircraft. New types begin to be built of business aircraft and preliminary wind tunnel tests.

► Companies Listed—Generally, the established light aircraft are handling the program, including North American, Lockheed, Curtiss and Republic, the various "Big Five" in fighter design and production. Significant is the rapid emergence of the newcomers, the McDonnell Aircraft Corp., which is in the program as the only builder with two engines.

The swept wing design illustrates the most of shock waves and thereby permits a plane to fly faster before only serious drag is created at it. By first "banking in" under the nose burner, the new fighters are able to attain some and slightly supersonic speeds without running the stability risks of the straight wing airplane.

Engineers believe that the true supersonic airplane may use the forward swept wing idea but with very low aspect ratio (very close, straight wings). Both types of wings will be extremely thin, however, to

prevent excessive large accelerations to achieve over their curved surfaces.

► Pioneer Fighters—McDonnell's two entries are the XP 57, Pioneer Fighter, and the XP 58, Interceptor. Additional details on the XP 58 reveal the use of swept wings and a combination "V" and conventional vertical stabilizer. All systems will be stored in the back bay of the Convair X-15. The XP 57 is obviously the small jet fighter ever produced by the AAF and an outlier, barrel-shaped fuselage is little more than streamlining for the Westinghouse 24C turbojet unit. Its top speed is well over the 650 mph mark at its level.

Because it is designed for landing and recovery should the 10 MA, the engine can be cut out as a landing gear of any kind. The XP 58 is a long, thin swept wing with powered by two 24C units mounted in the belly in streamlined housing. It is driven by a jet engine in the 550 mph class and may not be a "V" tail.

North American's line only is the XP 56, a swept wing version of the unclassified XP 57 Navy Fighter. Like the new version, the XP 56 is a single 15 turbo jet unit and is slated for a top speed of 600 mph.

for this 650 mph.

► All Weather Fighters—The Convair XP 55 is classified "all weather" with complete radar equipment of armament, forward view and navigational equipment. A two engine design, it is powered by two Westinghouse 24C units mounted in pairs in wing nacelles. It is an adaptation of the XA-43, following the AAF's decision to abandon "Attack" search used for ground comparison data. Top speed is well over 600 mph with speed on a long range of more than 3,000 miles.

Continuing the adoption of the swept wing principle in various modified types, the Northrop XP 59 is a service version of the X-4 Delta wing research type. The combat version unit create similar twist and turn and is powered by two 15 units, as in the X-4. Late reports indicate that the XP 59 may be flying before the ground research type, which was to furnish data for its design.

► New Interceptors—The XP 56, 58 and 59 are combination fighter and rocket types intended for short duration, high speed response in interceptors. The Lockheed XP 59 has two Westinghouse 24C units for cruising power and carries two rocket motors for takeoff and fast climb to combat altitude. When the rocket units are used for intercepting hostile aircraft, the XP 59 has two Westinghouse 24C units for speed.

Republic's XP 51 is a "Back Bay" edition of tomorrow's fighter plane with a needle nose shock cone to prevent supersonic speed. It is powered by a speed 135 unit.



STRATOCRUISER TRIES ITS WINGS

Boeing Aircraft Co.'s first Stratocruiser shows it itself as its master flight (Aviation Week, July 14). With gross island weight of 100,000 lb.—35,000 lb. less than maximum—plane was airborne after run of 1,160 ft. On first climb, it stayed aloft for 3 hr., 15 min., then landed and for strong variable pitch propellers, was checked by a ship after a roll of 1,500 ft.

Lockheed Subsidiaries Increasing Profitability

Service unit expansion will contribute to earnings of parent company; Constellation program provides broader base for charging off development costs.

Recent Navy award of an additional contract for modification of aircraft in Lockheed Aircraft Service, Inc., focuses attention on the expansion of the various subsidiaries to their parent, Lockheed Aircraft Corp. While the parent company, in common with other aircraft builders, is finding it difficult to show current revenues, its subsidiaries are showing an increasing degree of profitability.

Lockheed Aircraft Service, Inc. was formed under the year to service and maintain all types of equipment. It previously carried a Navy maintenance and maintenance contract for 90 planes amounting to \$3.5 million. This contract expired August 31, 1965, and will then expire 121 planes. It is estimated that this will assure continuing operations up to December, 1966. Currently the service unit has the largest modification contracts with the Army and commercial operations. An incident which ties together the parent company is present in that it is involved in retraining for another service unit in Constellation operations. The service unit, with bases at Burbank, California, New York, and Phoenix, Ariz., is in a position to expand its activities to meet important and profitable contracts in the maintenance of the parent.

Perse Import—Another profitable subsidiary of Lockheed Aircraft Corp. is Perse Power Corp. This unit is already doing a volume of its parent's own service. This subsidiary is continuing due to the financing of automobiles and other items not related to the aircraft industry. During 1966, Lockheed announced its holding in this subsidiary by the purchase of 17,600 additional shares bringing its total holdings to 254,137 shares or about 95 percent of the total. The total cost of this investment is \$55,079,149. However, Lockheed's equity in the net assets of the finance company as of December 31, 1965, was \$15,131,490.

Rebelle's recent advice that the finance company's ownership for the year may cost about \$200,000 to \$300,000 per share on Lockheed's stock.

Lockheed Air Transport, Inc., another subsidiary, continues to operate profitably despite the removal of some of the airline subsidies to the newly enlarged and increased

parent Los Angeles Municipal Airport. The loss of passenger subsidies has been more than offset by the addition of the parent's largest airport contract to the parent. In view of the great population increase projected by Los Angeles, it is believed that sufficient traffic is available to support both service airports. On this point, Lockheed the company may be expected to maintain its profitability.

Assignment Profit—Another subsidiary, the Assignment Company, which was organized in 1941, showed a profit of \$149,000 in 1965. This unit is involved in the sale of the "subsidies" assigned to the development, manufacture and distribution of a complete line of ground handling equipment and tools for all sizes and types of aircraft and aircraft equipment.

Lockheed Aircraft Corp. in its own operations is believed to have passed through the most difficult phase of its transition and is approaching the point where better results may be anticipated. During 1966, the company is expected to show a net operating loss of \$12,526,914. However, its credits and special services converted this deficit to a reported net profit of \$1,511,781. It is believed that the company will show a loss of a few million dollars for the last half of this year. Lockheed is in the process of effecting the acquisition and transfer of various properties with the government which may result in major accounting profits.

In order to finance its Constellation activities, the company incurred a total of \$45 million in bank loans. This is in the form of a \$10 million bank credit which was due December 31, 1966, and \$35 million in bank notes. It appears that the company will not be forced to do additional financing and the bank loans will most likely be liquidated on or before maturity.

Hand in hand virtually with the bank loans is the treasury position. As of March 31, 1967, such investments aggregated around \$146 million. The treasury position will be reduced as increasing allocations of the Constellation are made.

Progress—Rebelle—It is reported that the total Constellation program has been increased from 26 planes to a total of 175.

This provides a broader base against which to charge development costs. The company produced 75 of the first type of Constellation and 75 of the improved "GoldPate" model. The entire group of the first type have been sold. About 75 of the newer version remain unsold but most development costs appear will for their ultimate disposition.

Lockheed has a substantial military backlog which should assure high volume activity well into 1968. However, a continuing financial program is necessary if sustained earnings are to be shown. With increasing effort investment for a planning board to implement long-range research development, Lockheed may again be expected to take its place in the first line of aircraft design.

Stock Transactions Show New Confidence

For the first time this year, aviation officials appear to have confidence of their own company. This is reflected in the company of transactions for May in relation by Securities and Exchange Commission.

Coming when both phases of the industry are in the doldrums, it is the best indication of confidence in the group and its survival by its officials.

Lockheed Holdings—L. S. Ruckelshaus bought 100 shares of Lockheed in May. This was followed up with a subsequent purchase of 1,000 shares, which brought his total holdings to 40,000 shares.

It is also noteworthy that William F. Ryan, a consultant purchase of 44,444 percent of Lockheed through April and May, reported a purchase of 1,000 shares of the stock, bringing his total holdings to 3,333 shares. He also reported to having 16,666 shares of common or about 25 percent of the total stock.

Lockheed Acquisition—An interesting action of shareholders is revealed in related reports made by Kenneth G. Lynch of PCA. During 1966 he exercised various options to acquire a total 127 shares of common stock, increasing his holdings to 315 shares. He also reported to have purchased 4,000 of the company's debentures in September, 1966.

In further related reports, Stephen M. Brown, former president of Republic Aviation Corp. declines the sale of his entire holdings of 700 shares in February, 1967.

Additional Developments—Other significant transactions reported.

	Month	Shares	Cost	Total Holdings
Lockheed Aircraft Corp.	April	100	\$1	361
Lockheed Aircraft Corp.	May	1,000	\$100	4,000
Lockheed Aircraft Corp.	May	1,000	\$100	4,000
Lockheed Aircraft Corp.	May	1,000	\$100	4,000
Lockheed Aircraft Corp.	May	1,000	\$100	4,000
Lockheed Aircraft Corp.	May	1,000	\$100	4,000
Lockheed Aircraft Corp.	May	1,000	\$100	4,000
Lockheed Aircraft Corp.	May	1,000	\$100	4,000
Lockheed Aircraft Corp.	May	1,000	\$100	4,000
Lockheed Aircraft Corp.	May	1,000	\$100	4,000

Allison Turbo-Jet Production Indicates Impressive Potential

Largest volume maker of J-33 and J-35 engines could easily multiply present rate many times.

By ALEXANDER M. SURELY

Two airplanes are outstanding to the observer who visits the Allison jet engine plant in Myrtlewood, Indianapolis, Ind., where the General Motors Division is having set the engine at a working model rate of about 200/174 a month.

The Allison operation is the largest engine production of the new type jet engine plant which has revolutionized aviation in the last few years, and probably the only jet engine assembly line production in the world.

The production potential of the huge new Allison plant, which has been set up at the same level, is far more impressive than its present rate.

Approximately 3,000 of Allison's 2500 engines are working on jet engines. But the production could be multiplied many times if more materials and engineering were used by continuously increasing present assembly machine tools, which are working to only a small fraction of their capacity.

As Allison visit such as the Allison plant, which produces about 1000 jet engines per month in production on 1600 jet V-1710 in opposing regions, with approximately 28,000 employees, offer an interesting contrast with the current production rate.

Production Allison operations are still making V-1710s, now rated at 210 hp, in power plants for the North American F-105. The Allison long range jet engine, producing them at the rate of approximately 16 a month, is the total Allison production of current engines now over 200 a month. It is also at its peak, the division is making their stock shares for GM assets, including 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th, 101st, 102nd, 103rd, 104th, 105th, 106th, 107th, 108th, 109th, 110th, 111th, 112th, 113th, 114th, 115th, 116th, 117th, 118th, 119th, 120th, 121st, 122nd, 123rd, 124th, 125th, 126th, 127th, 128th, 129th, 130th, 131st, 132nd, 133rd, 134th, 135th, 136th, 137th, 138th, 139th, 140th, 141st, 142nd, 143rd, 144th, 145th, 146th, 147th, 148th, 149th, 150th, 151st, 152nd, 153rd, 154th, 155th, 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Electrol Aims At Landing Gear Market With New Lightplane Item

Economical hydraulic gear uses A-N standard parts; widespread supply sources and available replacement parts are features; for planes to 3,000 lb.

Potential capture of a large share of the lightweight landing gear market is seen in the development by Glanville, fab of an unconventional, light weight hydraulic gear which says Army Navy standard parts almost exclusively and which, although a separate and earlier project, will complement the efforts of the National Aircraft Standards Committee to standardize on a wheel-brake-oleo combination for lightplanes (Aviation News, Mar 31).

The Electrical gear, by use of A/N standard parts, is able to produce a quality item at minimum cost because of widespread sources of supply. The same general availability of replacement parts simplifies and reduces cost of maintenance. In addition to the standardization of parts, the many versions of the gear are standardized in the extent that parts designed to perform similar functions are interchangeable.

► **Used as a Eucrope**—The standard gear is used on the Eucrope and on several forth-coasting personal planes, and can be used on any aircraft up to 3,000 lb. gross weight. It can be powered by bicycle hand or by cycle retractable gear, with standard nose wheel, or rearing, for conventional gear, fixed or retractable. Modifications of the standard gear are used on Republic's Seabee and Ball Balancers.

While the use of standard parts is the great contributor to the low-cost of Elvaco's gear, the emphasis on simplified design and production of President Ben Ashton (Amersham, Nov. '46), plus the company's area-year specializations as assets by-products is a sensible factor in keeping down costs.

► **Other Products**—Electrol produces lead hydraulic pumps and systems, solenoid valves, check valves, actuating cylinders, unloader valves, relief valves, servo units, at less than \$2 each on Cummins Aircraft's Midland, Southern most of the hydrostatic for the F3P, made the pressure regulator for the auto hydraulic system and other items for Douglas Aircraft's transonic research plane, Sky streak, and has various equipment in Re search's F-54.

That business, plus commercial real-estate enabled the Kingston, N. Y., company to wind up its fiscal year April 31 with net sales of \$551,800, a healthy business for a plant with a 120-man payroll. Future prospects are indicated by a backlog, chiefly accounted, of \$750,000.

► **Solar Glaceth Antidriped**—(U) and the light-plant market expands according to laws, annual business volume will be Kloron's

Electrol Model 480-3F is designed for use as the main assembly on a low-wing, tri-cycle gear aircraft. The inherent effectiveness of an air-val gear enabled the design of a short, hence lighter and sturdier, gear with the result that each assembly weighs but 11 lb. for a 2,000 lb. airplane and but 16 lb. for a 3,000 lb. airplane, less wheel, tire and brake.

► **Soft Landings**—The grow provides 71 inches of wheel travel, a factor in allowing soft landings and preventing bottoming. The rigid factor, as shown by actual drop test, is 2.65 Gs from 138 in. and 3 Gs from 14 in. The wheel is mounted in a true arrangement to help bring it back of the CG. The grow can be attached to the main bows of the wing using the vertical element of the leg is about 30 in. forward of the wheel's axleline.

The olio cylinder is 2.65T aluminum alloy, 28 in. in diameter with 36 in. wall thickness. The piston is heat treated chrome molybdenum steel tubing, 28 in. in diameter, with an aluminum cap. It is chrome plated for resistance to corrosion and wear. The piston rings in a large housing (28 in.) and there is no contact with the olio cylinder's wall, therefore, no wear on the wall. Since the cylinder is the most expensive part, the method of support reduces external rupture wear costs. At the same time, it helps reduce the initial cost of the gear because it lowers manufacturing costs.

► **Compaction Models**—Electrol's Model 400-16 hydraulic steel wheel broding gear unit is the companion piece to the Model 400-57 and has the same jg load factor. It weighs but 124 lb., has wheel tire and brake.

The gear has an 11 in. stroke. The support table is also the cylinder. The spindle is mounted on the outside as required to provide for either free sanding or steering. The pulser is made in construction to that used in the main gear, but is 11 in. in diameter. In the nose gear, the pulser is carried in two bearings, as 5 in. bearing centers have been specified.

► **Design for Conventional**—The Model 430 I hydraulic main landing gear is designed for aircraft having conventional landing gear arrangement. Since it is to be mounted ahead of the aircraft's center of gravity, a cowlfloor strut, similar in principle to the Model 430-16, is used.



ITALIAN ROADFARER

Two-place combatants each built new MiGs, likely, and reported to have cruising speed of about 108 mph on an 80 hp. engine which is also said to be great power. Fuselages and wings are metal and elements are fabric-covered. Wings can be folded by removal of one bolt on each wing.

New Type Carburetor Developed by Bendix

Boeing Aviation Corp. has developed a new fuel tank which meters fuel in response to engine rpm variation, unlike

Main components include vine-type engine driven fuel pump, crankshaft governor

regulate with temperature and oil pressure. Automatic bellows, accelerating pump, water regulator and fuel discharge needle. Runs on fuel in an external combustion engine is started by rpm and manifold pressure, the Stromberg Speed Density system operates with a variable venturi orifice controlled by manifold pressure, with the venturi being controlled by engine speed.

The support cylinder is $1\frac{1}{2}$ in. 143T aluminum alloy. The piston diameter is $1\frac{1}{2}$ in. The water also enters in two locations.

No other propeller gives all these advantages

EVERY FEATURE PROVED AND IN SERVICE

CURTISS ELECTRIC PROPELLERS

PROPELLER DIVISION CURTISS WRIGHT CALDWELL, INC. MADE IN U.S.A.

STEADY CONSTANT SPEED CONTROL

REVERSE THRUST

SELECTIVE FLEXIBLE PITCH

FEATHERING

THERMAL DE-ICING

ALL CENTER CONTROL

ALL TEMPERATURE RELIABILITY

ANTI-ICE/ANTI-FOULING

FLEXIBILITY OF ELECTRICAL CONTROL

Lightplanes to Benefit From New Data

AVIATION WEEK survey shows research studies now ready on factors necessary to build improved performance, readily salable personal plane.

The long sought high performance, all weather sport personal plane is on the way, the Aviation Week survey of available research data now available shows tomorrow's lightplane could combine these highly all-weather features:

- Two cockpit operations: safe, space proof, and limited complexity.
- Multibladed, fly-by-wire propeller—probably with conventional engine-to-suction assist.
- Smooth wing and fuselage with maximum lift/weight for optimum performance.
- Fast response engine with protected air intake, decontaminated, controlled "hot spot" and no chance, for both noise reduction and fuel/air protection.
- Highly tapered wing with variable twist, will combine both stress with control in turning toward the top.
- Spoiler/airbrake, allows for lateral control, preventing full speed skidded turns.
- Vertical grip necessary stability and control with low cost.

The additional research data will continue to be available for better lightplane design as indicated by the fact that isolated problems of the personal aircraft industry have been given high priority by the NACA. Wind tunnel tests at the basic NACA lab indicate will benefit from current down to low Reynolds numbers (small speeds, air densities and model) were enhancing the equivalent of lightplane operating range (100 mph) to meet applicability of results to contemporary small, low speed aircraft.

Significance of this research is seen in the fact that it will now accelerate current operating time and additional investment and development time and effort by the NACA still to extend data below required high speed

testing range. For example, tests of a high speed lighter or glider aircraft wing or fuselage at high subsonic speeds will be extended down to low speeds before the wind is shut down, and research instrumentation will continue to extend data down through the equivalent of lightplane landing speed.

• **Wing Design.** Research helps indicate that changes in camber have little effect on the drag of laminar flow wings, thereby proving that flow over airfoils, which require comparatively large camber to produce lift at low speeds. Changes in camber on low drag aircraft mainly will be the steps of angle of attack on which low drag is obtained, thereby providing the designer to select a laminar flow section producing low drag at existing angle of attack. These new airfoils have subsonic lift about half the drag of equivalent conventional sections, half with either elliptical or rounded, cambered airfoil of the existing speed plane available to lightplane designer. Smooth construction is essential, however, to prevent low drag characteristics of the section.

Lateral stability, essential by wingtip drag control by top surface, can presently be avoided by using only small tips, which cut wing down, a fairly thin, well-located aileron and increasing the camber toward the tip. Tests have indicated that the deflected tip improves the lift/drag at a high lift device due to its lower drag and consequent reduced effect on airplane stability. Secondary layer control in showing air curving around planes and this thereby available, indicates its effectiveness in its strong lift and lowering drag.

• **Stability and Control.** A surprising and encouraging study of current research in the reduction of low speed (high speed) stability is not essential and that the designer

in pitch of the horizontal tail is relatively unimportant. It has been found that the static margin is more important stability in the existing design, thereby which reduces a complicated complex problem in a simple, straightforward solution of CG location.

A greatly important discovery in that lateral stability is best obtained by placing on a high degree of directional stability through use of a large vertical tail section. Research continues to validate the growing promise of spacers for lateral control (first used on the Northrop P-60). Tests indicate that shortening the engine front line makes possible less reliance on the effect of position on and all on stability and control. The "wet" tail has been on the Beech Bonanza is proving increasingly preferred and its presence of adequate stability and control with either elliptical or rounded, cambered tail providing drag reduction.

• **Speeding and safety.** Speeding design is now thoroughly understood and design data is available to the designer. Although design data for two-seater operation is available, the NACA is making a feasibility study for a single seat, high speed, high speed aircraft through a speed linkage and has revealed that it will definitely increase flight speed of new and interesting types of personal aircraft, making various types of new research projects.

• **Drag Reduction.** Recent data indicate that the drag "cleaning" of various design details could reduce the drag of a typical personal aircraft 15%, increase its speed 10% and reduce its fuel consumption 10%. These studies reveal that the detail design of engine cowling, air scoop, air intake, wing and tail, wing, wing endplates and power plant (also see Aviation, May, p. 77, Jan, p. 64).

• **Propulsion.** Designer appears to be the first to efficiency, which concerns with greater diameter. Recent studies indicate that such factors as blade axial section, thick, thin, pitch distribution, plus flow and stability have little effect on takeoff performance of a lightplane—proving to control takeoff pitch in the static efficiency method. The same performance of a lightplane may be reduced 90% through the use of multi-bladed, fly-by-wire propeller, reducing the airframe virtually unobtainable at a distance of 100 ft. Studies of pulsed combustion

show efficiency gains created by water interference, which is increased by increasing variable loading gear and tips.

• **Cost.** Latest studies reveal that loads imposed by push or lightplane are not often greater than the maximum loads for which the airplane was designed. Future lightplanes can be designed to just load factor, rather than conventional test loads, using available knowledge on the frequency of occurrence of gusts in the atmosphere.

• **Weather Protection.** An all weather light plane is within reach on the basis of available research data. Static equivalent of a low water, now in use as new procedure through the use of a protected air intake. Thermal design of the wing leading edge by radiant heat can provide air circulation under even the most severe, long, steady rain. The combination of air ingestion, thermally controlled "hot spots," no danger and speed easily passing, does not effectively eliminate the wing being in lightplane power plants.

• **Future.** Research—improvements in safety, economy and performance of personal aircraft will continue to require cooperative efforts of fundamental scientific research and applied development work by universities. The present day of 35 years of applied effort behind available data will be considerably if the lightplane is to be improved rapidly enough to build up wide speed market.

Continued research on lateral control and tail surface section will further increase the safety of the lightplane and still existing wing design, coupled with low drag high lift devices will create a combination as the leading edge and joint still requirements now exist. Investigation of the NACA research on lateral control, stability and, practically, can greatly advance performance to a point where it is felt that cruising speeds might well place the lightplane in competition with section at distances up to 100 mi.

Further research is pertinent to lower the still required for safe personal aircraft operation, thereby broadening its appeal which, in turn, will permit more extensive competition with the sports automobile.

References—All NACA Reports

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CURT RESEARCH shows "Taurus" lightplane can be designed to get low load factors, and also show conventional load factors, using available knowledge on frequency of occurrence of gusts.

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17. Smith, Louis S., and Doolittle, Robert C. Summary of Aerial Data. *Warfare Report No. 1-150*.
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"VIE TAIL" is used on Beech Bonanza is proving increasingly preferred and its presence of adequate stability and control with low surface area thus conventional lift provides drag reduction.

Studies Substantiate Theory Of Laminar-To-Turbulent Flow

Cause of drag bogey of modern high-speed aircraft—boundary layer flow turbulence—experimentally determined to be related to amplification of velocity oscillations.

Results of wind tunnel experiments at the National Bureau of Standards, with the cooperation of the National Advisory Committee for Aeronautics, afford a more complete understanding of the origin of air flow turbulence characteristics. The transition from smooth to turbulent flow—a most important factor in the drag of slender aircraft—has been found to be directly related to the growth of velocity oscillations in the thin boundary layer, through which slipping takes place when relative motion of a solid surface with respect to air occurs.

When a well-streamlined body is subjected to air flow, the boundary layer envelopes it as a sort of skin. Friction between the body and air depends greatly upon the thickness of this layer and the ease with which the strata of air slide past each other. If the sliding is opposed only by viscosity of the air, the flow is said to be smooth, or laminar, and friction is low. But if the flow becomes turbulent, the strata intermingle, no longer sliding easily over one another, and friction is high.

Transition Theory.—At the stomach of our face over which the air has passed increases, the boundary layer thickness, becoming increasingly impermeable to aerodynamic forces. The boundary layer is not only thicker, but more stable, and at some point transitions to turbulent flow course. One of the more important questions in the construction has been, what determines the stability of a boundary layer? The answer, it is now known, both theoretical and experimentally, failed to answer this question. However, in the early '30's two German aerodynamicists, Tollmien and Schlichting, followed by Lord Rayleigh, succeeded in finding criteria for stability at the boundary layer forced when air flows along a plane surface in contact with a rough place. As to this theory, it is not yet possible to calculate variations in the boundary layer thickness and produce solutions were

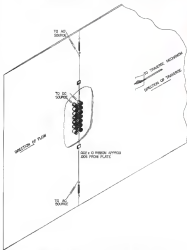
length determined by the frequency of the disturbance. Cortes says lengths would be amplified while others would be damped. The growth of amplified waves was assumed to result in transition to turbulent flow.

► **Flow Reexamined.**—The theory was not above criticism and was discredited from the start by experimentalists because amplified waves could not be found. Ex-

use of the hot-wire anemometer, which was
 because an increasingly anisotropic tool

For the investigation of such phenomena, it was shown that disturbances, such as those produced by turbulence in the far upstream flow, did cause regular motions in the boundary layer, but there was no apparent growth of amplified waves leading to transition. The conclusion drawn from all experimental evidence was that change to turbulent flow occurred when the boundary layer was sufficiently disturbed by external influences.

That was the status of the problem, when a fresh attack was first made by the aerodynamic group of the National Bureau of Standards. As a result of the previous work, there was considerable interest in the possible effect on a language boundary here.



TEST SETUP FOR FLOW-TRANSITION STUDY. Schematic drawing of apparatus for study of transition from smooth to turbulent air flow in boundary layer adjacent to flat aluminum plate five thick, 48 in wide, and 12 ft long. To cause oscillations upstream, two metal ribbons were stretched across plate within boundary layer at known distance from heated leading edge and held electrically to flow by thin spring blades. Electromagnet behind plate provided steady magnetic field, so that alternating current passing through ribbons caused it to vibrate, producing oscillations which traveled downstream to be picked up by microphone. Microphone output was amplified, filtered, averaged, and recorded as a function of streamwise distance, by crystal oscilloscope and recorder.

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LANDING GEAR—Here, three basic steels lead North American to specify "8630" Nickel Chromium-molybdenum steel rodstock—uniform strength, toughness after suitable heat treating, and ready fabrication by welding.

For safety and dependability, use Nickel alloy steels.



Over the years, International Nickel has assembled a host of useful references on the selection, fabrication, treatment and performance of engineering alloy steels. Complete catalog, technical literature, and other data sheets describing Nickel. This information and data are made for the INCO "Write for Book A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 37 WALL STREET
NEW YORK 5, N.Y.

AVIATION WEEK, July 27, 1947

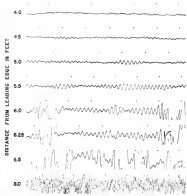
disturbance could be reduced to the vanishing point. One difficulty with wind tunnel experiments up to that time had been the disturbing influence of stream turbulence, and the need for less turbulent wind tunnels was becoming increasingly acute. Accordingly, the Bureau of Naval Weapons undertook an investigation of damping means and found that by their use turbulence could be reduced to previously unobtainable levels. Along with this meant given the extent of laminar flow along a flat plate was studied as the turbulence of the tunnel was reduced. Contrary to expectations the extent of laminar flow did not continue to increase with reduction in stream turbulence, but reached a limit beyond which no further change occurred.

The hot wire anemometer was thus placed in the laminar boundary layer, to determine the extent to which the layer was disturbed when the tunnel flow was known to be exceedingly smooth. A very strange phenomenon was observed—velocity was found to vary in a sinusoidal manner with a frequency so definite that it could be determined only. The oscillation occurred in amplitude with distance from the leading edge of the flat plate and finally broke into turbulent flow. Thus, amplified velocity waves leading to transition were found to be a reality. Comparison with the Tollmien-Schlichting criteria showed that wave growth took place where it was expected according to theory.

Further Fanning of Theory—With this discovery, the stability theory, which had been merely of mathematical interest, assumed real significance, and attention was turned to further experimental studies designed to support the theory to more agree with what was observed. Since the experimental counterpart of the mathematical procedure in the theoretical analysis, a periodic stream function was substituted as a differential equation and solutions were obtained for various prescribed conditions. The most important approach was then to cause a possible disturbance in the boundary layer and to study the characteristics of the resulting wave.

Test Apparatus—To produce these boundary layer disturbances, a metal ribbon was vibrated across a flat aluminum plate at a known distance from the sharp leading edge and sufficiently close to the surface to be within the boundary layer. Control portions of the ribbon were securely spaced and held adjacent to the flow by thin copper blades. Electro magnets were placed on the back of the plate to produce a steady magnetic field, so that when an alternating current was passed through the ribbon it would vibrate as well out from the surface.

When air was flowing, the waves produced by the vibrating ribbon traveled down stream past the hot wire anemometer. The wire could be moved forward and aft along the plate at a fixed distance from the surface to measure the growth or decay of the wave.



GRAPHIC DATA OF BOUNDARY LAYER FLOW These anemograms show successive stages in transition from laminar to turbulent flow as boundary layer of flat plate subjected to air current. Experiments show that transition is result of the amplification of oscillations of freestream frequencies caused by variations of velocity within boundary layer. Velocity variations were picked up by hot wire anemometer and registered on oscillograph oscillogram. Oscillograms show an amplified component of random disturbances originating in stream outside boundary layer. Amplitude of oscillations increased with distance from leading edge of plate. At about 6.5 feet, bursts of extremely large amplitude occurred, and at initial point of transition were accompanied by complex high frequency fluctuations characteristic of turbulence.

as it traveled downstream through the boundary layer. Wave height was selected at will by choosing various frequencies for the ribbon. By fine provisions amplified, damped and neutral waves were found, and wave diagrams were prepared similar to those indicated by the theory. From these diagrams were produced maps showing areas of damping and amplification. On the whole the agreement with theory was excellent.

These investigations have led to modern experiments only a covered surface as well as a measurement of the theory, at the California Institute of Technology. The latter work has been that the conditions governing the stability of laminar boundary layer are now understood and the theory may be used with complete confidence.

Transition from laminar to turbulent flow may result from a velocity wave, set up either by a vibrating object in the boundary layer, such as the ribbon, or by disturbances from the outside such as stream turbulence and sound. Stream turbulence, as previously

mentioned, may cause transition by carrying with frequency thus does sound. Sound disturbances with a concentration of energy in frequency bands that are highly amplified by the boundary layer may thus be more conducive to early transition than stream turbulence. This is important in free flight where turbulence is probably negligible but where engine and propeller noise is present in large amounts.

It is possible that boundary layer models may now also have entered as well as external disturbances—from surface stress lines and eddies of the air. A carefully distributed roughness may produce either surface to small amounts of turbulence in the air stream. Vibrations of the surface, like sound may produce conditions when the frequency is near some value that is highly amplified by the boundary layer. An investigation of these and other phases of the problem promises to provide additional useful information on this important problem of transition from laminar to turbulent flow.

All-Weather Tests Speeded By New AAF Climatic Hangar

Grilling of aircraft and equipment in world's biggest hot-cold laboratory saves time and money. Commercial use seen at later date.

A project to speed operational testing of Army Air Force aircraft, ground equipment and personal clothing at substantial cost savings is nearing completion at Eglin Field, Fla. Essentially a man-made climatic proving ground, the project consists mainly of an isolated hangar 320 x 210 x 48 ft., enclosing about 2,000,000 cu ft. of space, with additional cold test, hot test, jungle and temperature rooms in all-weather rooms for physiological testing and a status chamber.

Facilities are available to simulate nearly any military conditions an aircraft, but use of the climatic hangar will be limited to the military testing it is designed.

Operating costs, which greatly exceed testing will be required to show, run about \$1,000,000 annually. The hangar cost \$5,000,000 to build—about \$7,000,000 with full equipment—and is expected to pay for itself in five years or less. Also for the facility is ordered to Col. Aubrey C. McKinley of Stirling, Va., and the project was approved and completed through efforts of Gen. Geoffrey Graham and Col. H. D. Bennett of Air Proving Ground Command.

Eng. Gen. Carl A. Buehler, commanding general of AFPG, says the hangar will not "overheat them shoulder to shoulder." The main hangar space is used to determine types of equipment which demonstrate efficiency in conditions of extreme cold, storm, heat and snow.

► **Thousand Facilities**—Capable of across simulating the B-29 at one time, the structure at present contains one B-29, a Fairchild C-47, three lighters including a Lockheed P-38, North American P-51 and Republic P-47, a Sikorski HO helicopter, several Army Air Force trucks and a jeep, all of which have been subjected to weeks of better temperature ranging from zero to -75 deg. Temperatures within the hangar and test rooms can be maintained within range of zero 75 to plus 145 deg. F. Actual sunlight and simulated wind means up to 100 mph with dust, snow and rain are possible.

Facilities permit test runs on all types of aircraft. Engines can be run up and ground tested, weapons fired, bombs dropped, landings and takeoffs simulated to test landing gear, struts, brakes, control, and (sometimes) of electrical, hydraulic and heating systems tested under extreme weather conditions. Objective in planning the project has been to simulate weather conditions as closely as possible in that testing can be accelerated with final

service testing in actual locations. Method of testing equipment is essentially the same as the 50-lb. test of aircraft plus operation of all operable parts such as cables, bomb bay, dummies, etc.

► **Defects Uncovered**—Most common failures uncovered in cold weather testing of plants were electrical, stiffening of cables and lubrication, the latter protecting a constant problem. New oils and greases are better than previous products but require more flexibility. When they function at low temperatures, they are tested at high.

Other deficiencies and failures:
• Six volt battery packs discharging at about 10 deg. F., 12-v. drops at minus 45.
• Insulating cases in locations.
• Fuel lines frozen with cold due to different rates of contraction of component materials.

• Synthetic rubbers and plastics become brittle. Natural rubber cracks up faster.
• Fuel equipment becomes inoperative.
• Woodblock heating systems involved.
In addition, aircraft cockpit and control location operating on the ground as well as

in flight are needed for flying personnel. To keep warm on the ground before take off, pilots must wear Arctic clothing. Once in the air, they suffer from heat.

Previously all testing of aircraft and equipment for operational suitability, as in most climates has been done in natural locations.

► **Fast-Cost Saving**—Among the difficulties were transportation of personnel, equipment and supplies over great distances, time lost in waiting for suitable temperatures, difficulty of close correlation between design, construction and testing, variations due to distances from industrial centers, time needed to modify or change design of unsatisfactory equipment made testing all the more costly because better testing data again.

Indication of the time saved is provided by comparison of the testing period to spent at a natural location with that needed at the Eglin Field hangar. At Eglin Field, Alaska, 26 field tests required from September, 1945, to March, 1946, for completion. In the climatic hangar, 40 tests were made in six weeks.

In New Plant

Fairchild Helicopter Corp. has moved into its new \$500,000 helicopter development and manufacturing plant at Morton, Penna. Located on a 15-acre plot, 10 miles south west of Philadelphia, the new administrative building of 20,000 sq ft and manufacturing area of approximately 50,000 sq ft.



TELLIN' THE WORLD— YOU'VE GOT A FAIRCHILD F-24

You've also got great expectations! Of fun, excitement, winning through speed! Well, we can tell you... and we've had plenty of experience in aircraft... Being so wonderful! And it's even more so, if you know the following:

It's wise to use only the best quality fuels and lubricants. Remember that. And keep in mind also, you can always get much better quality aviation products by asking for Phillips 66!

You'll see—on airports over the entire mid-west—orange and black shields marked Phillips 66. These signs invite you to stop and take an carefully developed engine oils and 40W/60W lubricating grease! Yes, Phillips is concerned in helping you give us better performance and a cleaner engine!

Again, you'll see—when you meet us at our air field "66" sign! The Aviation Department, Phillips Petroleum Company, Bartlesville, Oklahoma.



AVIATION GASOLINE



JET PRINCIPLE UTILIZED IN NEW FRENCH 'COPIER.

Shown being tested for flight time in helicopter now test ENGARD-1100 "Copy-cat" Kopie-179 jet, armed Marko-200 as compressor to burn rate 1000 lbs. per jet, also three conventional 1000 lb. fuel tank per jet at 1000 lbs. per jet. Also three conventional 1000 lb. fuel tank per jet at 1000 lbs. per jet. Also three conventional 1000 lb. fuel tank per jet at 1000 lbs. per jet.

Technical Information
on FELY...No. 1

FELT WICKS

RELIABLE, CONTROLLED LUBRICATION

**Four Basic Wick-Feed Lubrication Systems Meet Diverse Requirements
Design Is Simple, Cost Is Low, Reliability and Long Life Assured**

Lubrication by means of felt wicks permits oil to be fed to bearings and other moving parts, automatically and without failure or interruption. Wicks permit extremely fine control of lubricant, from many drops to a small fraction of a drop per minute. Where actual consumption of oil is low, oil-impregnated felt makes possible the use of completely sealed parts, such as solid bearings, and is in fact essential to them. In such applications it can be expected that lubrication will be supplied throughout the life of the part, and that no attention will be required between major overhauls.

The cost of a felt work is low, in fact infinitesimal compared with the cost of the machine or part whose performance it predicts.

TYPES OF WICK OILERS

There are four types of wick lubrication systems. Choice of any given type depends upon such factors as the lubrication needs of the moving part, accessibility, available space, operating and servicing conditions, and number of masters of design and use. The Engineering and Research Laboratories of the American Felt Company will gladly collaborate with you in working out the design of the most desirable type of system and in selecting the proper size and grade of wick.

1. BOTTOM WICK DRIED

In this type, the bell work is an extension of a reservoir of oil located in the bearing, and through capillary action the oil is drawn to the point of lubrication. Maximum vertical wicking distance, about 6 inches. This is generally considered the most efficient system. Unused oil is returned to the reservoir and no attention is required beyond occasional cleaning and replenishing of oil as required. An ideal system for apparatus such as motors, generators, and battery equipment.



2. SIPHON WICK OILER

Felt seals of this type are widely used, particularly where oil is to be delivered uniformly and at a controlled rate to a remote friction point. In addition to other methods of control, the flow of lubricant can be increased by increasing the vertical wiping distance from the reservoir to the point of lubrication, taking advantage of gravity.



3. ABSORBENT OR PAD FEED OVER

How the lifeline is contained entirely within the belt, and is released automatically as required. This is the type often employed in aerial installations, though it may also be used in conjunction with a lifter cable, the chief purpose of which is to act as a small reserve.



A. TOP FIVE COUNTRIES

The reservoir is above the lubrication point, and oil is supplied through a bell siphon mounted on an outlet at the bottom. In this case, the work acts as an obstruction to control the flow of oil. Frequently the work is mechanically connected to effect further control while taking advantage of viscous coupling between construction and delivery points. This ensures uniform lubrication and provides a surplus reserve of oil in the event of a clogged reservoir.



SELECTION OF WICK FELTS

There are four grades of felt recommended for such laboratory systems. The physical characteristics of each are under complete control, and are standardized. As much care should be exercised in stock selection as in the choice of kiln itself. The felt must have the greatest strength capacity and resiliency. Porosity must be such that air circulation is maintained throughout the entire life of the kiln. The air velocity must be governed within close limits. And finally, it is necessary to avoid breaking down the air or conveying material. The stock must be highly cohesive, which requires medium to long fibers. Residual ash content must be low, to minimize glazing or sooting at the delivery point. All these requirements are thoroughly satisfied by American Felt Company products and production methods. Manufacture, test and inspection methods have been completely standardized, and the product is available in complete conformity within the four grades, and reliable, predictable performance. The four grades are as follows:

No	Lat/Long	Type of Work or Interfering Species
7344	F 1	Sound, Dry, Fynbush
7345	F 2	Deep, Wet, Shrubland Pool
81018	F 16	Abundant Pool, Wetland
81002	F 20	Red, Dry, Pool



HOW SUPPLIED

Wick felts are furnished either in bulk, or ready-cut into wicks to your own specifications: round, square, strip, pad, punched, or special types to meet your needs. By use of precision cutting techniques of modern design, American Felt Company wicks are customarily supplied with a dimensional accuracy of plus or minus .005 inch.

OTHER USES

Felt wicks can of course be used to carry or control a wide range of fluids such as water, ink, solvents. Felt can also be impregnated with viscous or solid lubricants such as grease, glycerine, dispersions of nonoxidized graphite, talc, hydrocarbonated and calciumated oils, silicone greases, and with various waxes, thus providing protection at points where loads and speeds are such that oil is not necessary.

SEND FOR DATA SHEET

The material in this advertisement that has been borrowed from American Felt Company Data Sheet No. 6, "Wool and Laidroverin." This eight page Data Sheet is the best authority upon the subject. It contains full technical data, including formulas, charts and graphs, tables. From it any engineer can calculate work performance and arrive at a design and specification that will meet the requirements of a given application. Works on poor letterhead and a copy will be sent you. Along with it you may wish to receive a list of the 15 American Felt Company Data Sheets containing technical information on the various characteristics, types and applications of felt and felt products.

General's compressor and bearing lubricated with SAE 30 oil with a better wick size. A 3/16" diameter American Petroleum Co. Model 7546 wick with a wicking distance of approximately 1 inch is used for this difficult lubricating job. With a shaft speed of 9000 RPM and a 300-hour oiling schedule these wicks always equal the life of the bearings, which are replaced after 100,000 miles or 3000 hours continuous operation.

BASIC PRINCIPLES OF WICK LUBRICATION

Wink-104 (104) is negatively related density with stick density
increases with all viscosity

Walking distance border within directly with oak canopy
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Get hand at delivery time is achieved by the disruption capacity of the web, its complexity, the cross-sectional area of the web, and the sliding distance.

HE9408 With system wide, the greater the width of the screen, and the greater the area enclosed, even the greater

While Indians stole the horses the working diplomats, and the garrison the civil and military, the people the

With updates before and after work, few can be adapted to substantially improving or reducing a worker's risk of injury.

All before revealed in the design of a work indicates issues have been substantially resolved by the American Bell Company and are acceptable to industry performance standards. For a full listing of material, and its performance, see the following references with no more details so that of any need to refer to them.

ENGINEERING TESTS OF FILT

Walls	Flaming Plants and Grass
Oil and Grease	Peeling
Rotaries	Polishing
Door Jamb	Caulking
Skirts	Insulation
Caulking and Shook	Sound Absorption

Abstract **Keywords:** *bullying, children, adolescents, victims, bullies, bullies-victims, bullies-bystanders*

**American Felt
Company**

Shangping and Research Fellowship
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Kushner, and Wolfgang M. F. Sauer

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Cleveland, St. Louis, Dallas, San Francisco.

New Aircraft and Engine Designs Pose Unusual Vibration Problems

Increasing airplane speeds and higher wing loadings have brought to light a new problem which is of fundamental concern to airplane designers as well as power plant engineers.

The problem, becoming particularly acute with a larger diameter propeller, is known as "one P" vibration, or "first propeller order vibration." It can cause propeller blade stresses of significant magnitude. To help in solving the vibration thus being created, Hamilton Standard Div. of United Aircraft Corp. has made a new set of most important problems and today is making no new data available to the industry.

► **The Problem—Simply stated, the vibration is due to the fact that the propeller blade is a whirling wheel, have aerodynamic principles apply, i. e., reflecting actual shape of the airfoil, the blade turns through the air and angle of attack, and so the square of the speed with which the air passes it. Thus, if blade angle of attack is varied, the lift (or forward force) will vary accordingly, when things being equal.**

When the thrust line is directly into the airstream, the blade will operate at a constant angle of attack through one revolution. But if there is an angle of inclination between thrust line and airstream, the propeller will operate at a varying angle of attack, subjecting the blades to fluctuating lift forces during each revolution.

Assume, for example, an aircraft is in a climb, thus taking the propeller plane of rotation to give considerable positive angle of inclination between thrust line and air stream. As the blade goes down downward, inclination angle is added to normal angle of attack, increasing lift force to a maximum when the blade is horizontal. At the top two-thirds of the turn, the aircraft is lift line is reduced because inclination angle has no effect on angle of attack. As the blade reaches horizontal on the upstroke, effective angle of attack is decreased by inclination angle, thus reducing lift (or forward force) to a minimum.

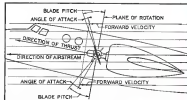
► **Additional Factors—Asymmetry between airframe and propeller disk is aggravated by influence of the wing on the air stream. Because of the wing lift, an upflow is set up approaching the leading edge as it is down, adding to aerodynamic loading. As angle of attack position of the wing. As lift is increased for climb, upflow is increased and the downflow to the propeller to the wing, the change in the angle. Under rising air conditions the two can be in appreciable effect because the angle of upflow into the propeller approaches the same angle of upflow into the wing angle of attack.**

With the blades lift increased and decreased such revolution whenever irregularity exists between airframe and airframe line, the

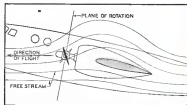
blade propeller is subjected to a powerful forced vibration. Intensity of the vibration will vary, according to theory, directly as the angle of inclination, or the square of forward speed and further at about 65 percent of the diameter, other conditions remaining constant.

A major difficulty with "one P" vibration is that there are no interest symptoms to cause there is no vibration machine at the engine itself. Too, there is no standard relationship or performance test to give warning. Through its pioneer has been known a much of Hamilton Standard's vibration stress examinations, its importance is caused undetected and vibration testing of propellers are now aircraft design as usual separate stages.

► **Magnitude of Problem—Magnitude of "one P" vibration depends on airplane operating conditions and how across the existing stress may be depends on fatigue**



NOTE: STRESSES ORIGINATE—Schematic drawing showing effect of angle of attack of one propeller blade during one revolution about plane of rotation (in this case).



BUILDING UP STRESSES—Upflow in airframe induced by wing in climbing position adds to upflow between blade and airframe.

strength of blade structure. It is believed that in modern plane design the events may be powerful enough to cause stress beyond established elastic strength of current blade design.

Because the conditions depend on load, speed, and angle of attack in relation to propeller characteristics, these factors can be added to advantage through the available test and maintenance of correct operating conditions.

► **Feasible Solution—Besides developing propeller design aimed at reducing "one P" vibration, Hamilton Standard suggests before the problem can be completely solved, before design. Today it is felt that having the propeller well forward of the wing leading edge is highly desirable, and that it may be necessary, in some cases, to tilt the propeller downward from the wing chord line.**

Good construction in predicting stress angles must also be given to the effect of propeller position on the airframe about the wing. In this connection, they report, many exhaustive use of flap in lifting various aircraft construction from actual design to operating stages.

HANSEN Couplings

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Martin Develops Propeller Feathering Unit

System designed to utilize fully high takeoff weights of new twin engine craft seen cutting operating costs 43 to 58 percent.

Designed to permit full takeoff weights and increase operating economy of twin engine transports is the first automatic propeller feathering unit developed by Glenn L. Martin Co.

Such a system, Martin engineers told Aviation Week, is a necessity if the high takeoff weights of newly developed twin engine airplanes are to be fully utilized.

Because of inherent high windmilling drag of high velocity turbine propellers being used in current and future designs, the problem of feathering aircraft has required special treatment in the case of twin engine aircraft if they are to be certified at maximum gross weight under Civil Air Regulations.

The Martin automatic feathering system secures the maximum economy benefits by causing optimum airplane performance during a complete or partial engine failure in flight. This is accomplished:

1. By feathering the propeller and stopping the fuel booster pump on the affected engine when power drops below a useful minimum for more than a momentary period.
2. By preventing the propeller to get back to a normal manner of its abrupt power loss in its momentary duration (such as an engine cough or upset) or if the power loss is only partial so that thrust being obtained is greater than that thrust being obtained from the propeller.
3. By providing means whereby the propeller may be feathered through the start and propeller system of power until a normal after takeoff feathering operation has begun. Then the pilot can at any time reverse the automatic system.

The high windmilling drag at the propeller has shown for three recent transports has resulted in a loss in estimated takeoff gross weight of approximately 5,000 lb. as an airport altitude of 4,500 ft. It is readily seen that such losses of this magnitude will result in a crippling increase in direct operating cost per ton mile. Preliminary tests indicate that entire amount can be recovered with the automatic feathering system.

Operating principle—A Martin 201 is operated over an average trip length of 300 mi. at an average speed of 1,000 ft. The automatic feathering system will result in an increase of approximately 4,000 lb. payload—equivalent to nine passengers and 2,200 lb. of cargo decreasing direct operating cost per ton mile by 41.2%. With higher airport altitudes, and cruise over 300 mi., this offset becomes even more pronounced. On a run from Los Angeles to Denver, for example, itself would be made at an altitude of 4,200 ft. and a range

of 300 mi. would be necessary. Here a payload increase of approximately 5,000 lb. would be realized—representing 17 passengers and 1,700 lb. of cargo and a reduced direct operating cost per ton mile of 25%.

This following major advantages have been incorporated in the Martin system:

1. Controllable elements of the system are arranged so that subsequent feathering of a normally operating engine is a responsible response of pilot action, urgent or optional. As an additional precautionary measure, a manual "off-air" switch is provided in the system can be rendered inoperative when in operation is not required.
2. Designed so that if one propeller has been feathered (either automatically or manually), the other propeller cannot be feathered automatically even if the low engine shows a power recovery.

3. Appropriate warning lights indicate the system has been tripped on and two others (one per engine) indicate that the engine engine system is normal, as desired.

4. Major Components: The major components of the automatic feathering system are shown schematically in Fig. 1. The circuit includes only standard electrical components arranged to simulate the actual feathering system and stop the engine fuel booster pumps. The system is tripped if a full high power has been attained during takeoff or a complete power loss occurs without the throttle having been retarded. Elements among engine performance (or engine rpm and pressure) are used.

5. Major switch in the throttle linkage act to close on, log of the wrong event when the throttle is advanced to a position corresponding to a low power takeoff.

6. Pressure switch mounted directly on the engine temperature gauge set to close the other leg of the automatic feathering circuit when the temperature pressure reaches 50 psi. (This corresponds to 55.5 in. Hg mean sea pressure, and 1,425 lb. sq. in. 2,500 psi.)

7. Pressure switch mounted directly on the engine temperature gauge set to close the auto main feathering circuit, while the system is closed, the temperature pressure drops below 30 psi.

Design of the automatic feathering system is based on the premise that, after the throttle has been advanced to its full position and the temperature pressure has exceeded 50 psi, the temperature pressure drops below 30 psi, without the throttle having been retarded, a complete power loss has been indicated. This is a valid premise since the power output at 30 psi temperature pressure is of the magnitude of 500 hp which is of the same magnitude to the engine as the engine is tripped.

The sequence of operations following such a drop is as follows:

1. A warning. The system will be tripped as a warning and retard before it is operative. A warning is accomplished automatically when the following conditions have been fulfilled:
1. The throttle must be advanced to its full position (The system is automatically tripped when the throttle is tripped).
2. While the throttle is in the wrong position, the temperature pressure must exceed 50 psi. (The system does not operate if the pressure subsequently drops below the warning value; it can be tripped only by the pilot action.)
3. The throttle or the engine or the engine manually through the use of the "off-air" switch).



FIG. 1 MAIN COMPONENTS of Martin automatic propeller feathering system: (1) automatic feather switch, which on power pump to throttle fuel switch and fuel booster linkage; (2) throttle fuel switch, which on advancing throttle; (3) high torque pressure switch, which when torque pressure increases to 50 psi, gives signal to feather feathering system; (4) auto main feathering switch, which when torque pressure increases to 50 psi, gives signal to feather feathering system; (5) auto main feathering switch, which when torque pressure increases to 50 psi, gives signal to feather feathering system; (6) auto main feathering switch, which when torque pressure increases to 50 psi, gives signal to feather feathering system; (7) feather feathering switch, which when torque pressure increases to 50 psi, gives signal to feather feathering system; (8) feather feathering switch, which when torque pressure increases to 50 psi, gives signal to feather feathering system; (9) feather feathering switch, which when torque pressure increases to 50 psi, gives signal to feather feathering system; (10) feather feathering switch, which when torque pressure increases to 50 psi, gives signal to feather feathering system.

► **Feathering**—Feathering is accomplished automatically if, while the system is armed, temperature remains above 100 ps. and stays below 20 ps. for a pre-determined time. (Initially presently set at 2 sec.) The fuel booster pump is stopped automatically and automatically is prevented loading the engine with fuel. Fuel control feathering device has power open time is not possible since temperature goes near below 20 ps. will not be attained before the 100's absolute ceiling of the thrust is at its full power.

Although this automatic feathering system meets all proposed CAA requirements, it embodies features adjustable to specific requirements of other CAA or airline operation. These features are:

► **Throttle system mechanism**—The control throttle position at which the mechanism closes is not critical, though it should not be set so high that the system will not be armed during a reduced power takeoff.

► **High pressure switch (warning switch)**—Again, the exact setting is not critical but it should not be so high as to preclude reduced power takeoff. The purpose of this switch is to prevent any possibility of feathering during a throttle burst which could close the throttle system automatically before its sensitive pressure had built up to 32 ps.

► **Low pressure switch**—If the engine were choked to approximately 30,000 ft. (which would require full rated power) and if the pilot then were to start the propeller governor control to minimum rpm with the throttle in idling position, the temperature pressure would drop to approximately 30 ps. The feathering system, if not turned off manually, would be armed. Although the possibility of an operation of this nature is remote, and while the system can be turned off manually when its protection is not required, the feathering pressure switch has been set at 30 ps to preclude inadvertent feathering even under this extreme condition. Settings of this switch, therefore, should be substantially less than 30 ps. Similarly settings for the switch should be substantially above zero to allow for temperature variations.

► **Time delay relay**—This controls the length of time that temperature pressure must be below 30 ps. before the feathering cycle is started. This can be adjusted but it appears that a setting between 0.5 and 2.0 sec. will afford protection against feathering. Being a mechanical device and will correct early initiation of feathering if a permanent power loss has been indicated.

The possibility that engine power may be assumed by some or all cylinders after feathering has been initiated has been considered, and analysis made to determine the power and RPM's that could be sustained under this condition. Fig. 2 then takes a typical power-rpm schedule that would be encountered under the most severe conditions (full power thrust at its level). It shows operating at standard take-off power (point A) power is lost and

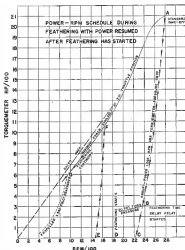


FIG. 2 TYPICAL POWER-RPM schedule possible under extreme conditions

plenty, temperature power and rpm will decrease rapidly along curve path such as AD. At B temperature pressure will drop below 30 ps. and the feathering time delay relay will be started. Temperature power will decrease to zero (point C) and the rpm will continue to drop. At some point such as D the time delay relay will initiate feathering.

Normally, feathering will continue until the engine has been stopped. However, if power is resumed promptly after feathering has started, feathering will continue but the temperature power and rpm will decrease along some path such as EF. At F the propeller will be at an intermediate pitch and the power will correspond to the maximum power available at idling throttle setting (The exact location of point F on the "maximum power available at TO throttle position" line will depend primarily on the amount of feathering accomplished prior to the resumption of power). The propeller will continue feathering until the full feather position is reached, point G, which is established by the attraction of the power available line and the full feathered propeller lead time. The engine may continue to operate at this point until the pilot unfeathers or stalls the throttle. Note that it is virtually impossible for idling RPM to be exceeded, even momentarily, and it is extremely improbable that normal rated RPM will be exceeded. As rotation cannot will be in zero rpm condition during takeoff and so reduced engine temperatures will be encountered at lower engine speeds, engine damage due to detonation, preignition, or excessive mechanical torque will not be encountered. This is also applicable to partial power operation, except that the engine will attempt to stabilize at a lower rpm, and the possibility of engine stalling will be increased. Part 4 Whitney representatives have indicated that their points of operation under such conditions should have no deleterious effect on the engine.

► **Feathering**—Feathering is accomplished automatically if, while the system is armed, temperature remains above 100 ps. and stays below 20 ps. for a pre-determined time. (Initially presently set at 2 sec.) The fuel booster pump is stopped automatically and automatically is prevented loading the engine with fuel. Fuel control feathering device has power open time is not possible since temperature goes near below 20 ps. will not be attained before the 100's absolute ceiling of the thrust is at its full power.



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AVIATION SALES & SERVICE

Exclusive Airport Franchise Opposed In CAA Fund Pact

CAA contends business on fields financed even in part by federal funds must be open to all.

By WILLIAM KROGER

An old and tedious argument is now making pathos—has come to life again, for some reason.

It is the question of the right of an airport owner to put exclusive franchises to land base operations and other businesses on airports which are partially financed by federal funds.

Franchise Reinstated.CAA, announced the franchise recently, when its long-standing policy opposing exclusive franchises was reversed as a result of the agreement which sponsors must make in order to get airport aid.

CAA, backed by a ruling of the Attorney General, contends that business operations must be open to all on fields constructed even in part by federal funds. There are signs that not all CAA officials agree with that policy, although proponents of non-exclusive rights still use as the majority.

Old Policy.Provisional companies generally favor the non-exclusive policy; so do representatives of private pilots, fixed base and airport operators on both sides of the argument.

Although CAA policy against exclusive rights is longstanding, the matter has assumed major importance recently with stipulating of CAA grants for airport construction. The requirement for sponsors is that they sign a "sponsor's assurance agreement," implicitly bound for winter along with the airport agreements. The agreement had a heavily worded box against the granting of exclusive rights.

Agreement Reversed.This section (and others) of the agreement has now been revised, and CAA, without official, along with various groups, now goes and today (July 21) to relevant committees. As now framed, the agreement provides: "The sponsor will not grant, exercise, or permit the exercise of any exclusive right for the use of the airport for commercial flight operations, including air cargo transportation, for the rental of aircraft, for the conduct of charter flights, for the operation of a flight school, for the carrying on of any other service or operation requiring the use of aircraft." Exclusive rights for non-aviation businesses, such as restaurants, are permitted.

Another section of the agreement states: "The sponsor will not thereafter permit to anyone an exclusive right to sell aviation gasoline or oil, to sell aircraft or aircraft parts or equipment, or to repair aircraft or aircraft engines."

Change Proposed.As originally written, that section ended with the word "all." In discussing a revision, some CAA personnel proposed a change that, in effect, would have permitted exclusive rights for the sale of fuel to airport users, but not to airlines or charter services. They proposed fields was dropped after protest from representative

ties of private pilots.

Fixed base operators generally oppose exclusive rights, but some have reservations. Those point out that there is such a thing as a non-exclusive franchise, that could be as precise economically as a large part of the industry, but which also might affect the safety of operations. Their confusion is as to whether a monopoly among an airport built partially with federal funds could ever attempt to regulate competition.

On the other side are the operators who have entered on competition, including those who have emerged as big in a competitive fight, and the consumers who are benefiting from a competitive situation.

CAA Contained Question.One of the most delicate aspects of the question is the extent to which CAA should attempt to control operations on airports. Inquiries are being initiated in the word "exclusive" as the section dealing with sale of gasoline and oil. Although the federal government may give part of the funds to construct or to improve an airport, it is up to the sponsor



NOBIS PERSONAL PLANE DESIGN

First photos of personal plane designs developed by Eugene W. Nobis indicate the business of design for Luscombe Aircraft Corp. Designed with design close to ground for personal use, but the plane would have twin power plants and retractable tricycle gear. Production plans were shelved because of current high costs.

to maintain the field. That puts up to the sponsor the responsibility of opening the field in such a manner as to yield sufficient return to cover maintenance and possibly amortization. The terms of the agreement are effective for a maximum of 20 years but "hereafter" could mean forever.

In some cases, it might be the sponsor's financial advantage to enter into an exclusive right for some service. The law on exclusive rights thus in effect depriving the sponsor of full power over the operation of the field. Whether it is desirable for CAA to have such control is one of the questions pending airport experts.

One proposal is that CAA eliminate any mention of exclusive or non-exclusive rights, leaving the matter up to sponsors for decision. It is possible not, however, that operation of airports is a public utility and that a "non-exclusive" policy by CAA might cause numerous claims and demonstrations.

Wings Field Gets New Distributorship

Ownership control of Philadelphia's Avion Corp. Branch and Republic distribution in the Philadelphia territory, has been acquired by Wings Field, Inc., through a stock exchange. Guy Miller, president of both companies, has announced.

Wings Field, Inc., operating company for Philadelphia's best-known private flight school, will set in motion the distribution firm in the Philadelphia metropolitan area for both lines of planes, while the distribution will continue in that function and will continue operation of a Link Trainer ground school. A local company, Philadelphia Air Service, Inc., has been named as a subsidiary to carry on repairs, charter and rental operations.

Wings Field, Inc., operates a flight school, maintenance shop and an hangar, with more hangars to be added soon. Philadelphia Aviation Company Club is located at Wings Field, and a number of two-engine company planes are based there as well as many private planes.

Alvin Smith is chairman and treasurer of Wings Field, Inc. Associated with Miller and Smith are Edgar E. Davis, vice president and field manager; Augustus Sargent, vice president for wholesale distribution; Donald E. Lewis, Jr., representative for retail sales; Theodore includes the client offices and J. A. Hixon III, and W. Wilcox Smith.

Michigan Appointments

Appointments of Gus S. Elough, Flynn, Mich., and Max Fontana, last two operators at Ann Arbor, Mich., in new members of the Michigan Aero-Club. Announcements have been announced by Gen. Ken Rieger, Col. Elough, P-47 fighter pilot in the European theater, is vice-president and general manager of the Day Manufacturing Co., Pontiac, Mich., and is president of the Michigan Aero-Club at Dearborn and from Dearborn since 1959.

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Super Cruisers Try Round World Flight

A round the world flight, designed to prove the reliability of helicopters in unusual conditions of flight, will be made by two Piper Cub Super Cruisers scheduled to take off from New York last week. Pilots are George Trueman, 39-year-old motorcycle kill clincher, and Clifford W. Brown, Jr., 28-year-old former AAF B-25 pilot.

The 23,918 mile route includes Canada, Greenland, Iceland, British Isles, Europe, Trans, Borneo, Java, Java, Korea, California, Bangkok, China, Hawaii, Asia and the U.S. to New York. Longest leg is the Hailuoke-Aleutians jump of 1,661 miles, which the two pilots hope can be made by Raa-na (passenger) is what it is Komechika, which would cut the distance to 1,000 miles.

The two 160 hp. cub owners have been fitted with an extra 100 gal. tank each, giving a total supply of 338 gallons, enough for a 27-hour, 2500 mile range, according to calculations. They will be between 20 percent constant instead for a round the world trip of the pilots as the other one continues for help.

The trip will take about 45 days and if completed, will be the first around the world helicopter flight, all other such attempts having ended in failure.

Fire Destroys Out Supply House At York, Pa.

Fire loss estimated at well over \$100,000 was suffered by Karl Ott, veteran aviator and supply dealer at York, Pa., recently when flames destroyed his warehouse and where this is a major building of the old York, Pa. port, some miles from the city, as his loss was his headquarters and he makes some of his place close his future progress.

Open Instrument Shop

SWS Instrument Sales & Service, Inc., has opened a CAA-approved repair station at Washington County, Argyle, White Plains, N.Y., with complete overhaul, repair and servicing facilities on instrument pilots, give instruments and all types of aircraft instruments, 5 M. Schindler, manager, has announced. The company is also an authorized Bendix radio dealer. A far side in aviation exchange plan enables customers to obtain complete instrumentation and associated instruments for maintenance use.

U. S. Methods Studied

Representatives of 40 countries have visited the U. S. to study test methods, according to CAA. Mission team came from previously every nation except our own. They have extended their visits to Europe and transport industries. Several nations have and mission specialists to study the U. S. government on up to civil aviation with a view to meeting it abroad.



PLAN ROUND-THE-WORLD CUB FLIGHT

Clifford W. Brown, Jr., at Washington, D. C. (left) and George W. Trueman, at Los Angeles (right) were scheduled to leave New York July 15 on 23,918 mile round-the-world flight in two Piper Cub Super Cruisers. They are being supported by George Bruckenthal, fire fighter here at College Park (2nd) support, where their new flight mission.

Firestone Products Licensed

Firestone Aircraft Company, Akron, will license other aircraft and accessory manufacturers to make Firestone aviation products and will supply the rubber components needed to license. Products to be licensed will include wheel and brake units, push-rod and strut suspension using the superior airspring principle, and the new Firestone semi-rigid landing gear for bicycle planes developed for CAA. The licensing plan will not limit commercial operations of Firestone aircraft and accessory distributors through local agent "show" who will in control the Firestone helicopter program.

About Helicopters

For those who don't understand exactly how a helicopter works, the Helicopter Council of Aircraft Industries Association has prepared a booklet which shows how it flies and what it can do, with graphic illustrations.

Placed in part of the Council's program to educate the public on the goal for making the helicopter as something different from a fixed wing aircraft, the booklet is being sent to some 5000 local, state and federal officials and others who should understand about helicopters. Still other copies will be distributed through the helicopter manufacturing companies which are members of the Council, and through helicopter operators.

New Details Reported On Sailplane Reported

Additional details on the water balloon system employed in the new Schleicher SGS 123 reveal that the additional 275 lb. of weight increases the cruising speed of the high performance model about 7 miles per hour. Major advantage of the new system is added range under load conditions. Under no load and balanced conditions, the water is dumped through high valves and the lower wing loading maintains the low sinking speed of the sailplane. The added adaptability of the 123 in coping with conditions requires an emergency rudder elevator, according to Ernst Schwenke, its designer.

Integral water tanks are created by the use of water-tight ribs and string composed in such way that loading ribs, float, not float, and not from the cockpit. Dump valves are repositioned from the cockpit.

Float control mechanism is used as a means in the 123 and careful attention has been paid to drag reduction to make the potential gain of the water ballast design.

Two sets of spoilers are used, one of them a double-spoiler set to reduce the approach speed and the other a separate set mounted in the wing inboard to cut the landing run to a minimum, thereby enabling the 123 to set down in otherwise inaccessible fields.

The SGS 123 has a span of 51.7 ft., wing area of 165 sq. ft., aspect ratio of 17.3 and a maximum flying weight of 995 lb. with ballast.

CAA Shifts Its Airport Emphasis

Fixed with the necessity of cutting its hold on proposed work on large airports, CAA is realigning its airport program to attempt to fit it into the \$25,000,000 appropriation granted for the current fiscal year—the bulk of the amount originally expected—and to provide runways affording a greater margin of safety for low engine planes.

Scope of the revised plan, which will be outlined later this month, will be determined to a great extent by the Presidential Safety Board's recommendations which, in effect, limit low engine aircraft operations to runways 4,000 ft. or more in length.

► **No. Estimate**—Another possible factor in the reshaping of the construction program is the runway classification according to use and weight of aircraft, suggested by CAA some time ago.

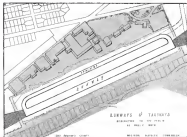
Pending re-determination of the program, CAA last week would not estimate the extent of the changes to be made or the original plan to improve 297 airports in the continental U. S. at a cost of \$65,000,000. The new program probably will be primarily concerned with Class IV and larger fields, although there was some indication that Class III and smaller fields may be affected. Overhauling things about the program for the two categories is that CAA already has had available as fiscal 1967 but has not yet allocated some \$14,000,000 for work on Class III and smaller fields.

► **Lower Aid**—The program to improve Class IV and larger fields was subject to Congressional approval. In May, when it became apparent that CAA would be given only one-half the funds at requested for Class IV and larger fields, Secretary of Commerce W. Averell Harriman estimated that the reduction would eliminate one-half of the projects on the list and leave CAA with a backlog of projects and requests totaling \$350,000,000. Harriman listed the projects that would be eliminated or reduced in cost. This estimate will be revised as CAA's past work is brought into study of the situation.

As of June 13, last, data for which figures are available, there were 156 airports in partial for operation, of four-engine equipment. Of these, only 77 were in use. Of these 77, it is shown by an American Wire analysis, 51 have one or more runways that are under the six-foot requirement of 4,000 ft. long or are unimproved. Of the total of 156 four-engine fields, 75 are in that category.

► **Program Improvements**—CAA actually proposed improvements at 135 of the 156 four-engine fields. Under the Harriman estimate, 55 of the 135 would be dropped from the program. Of the remaining 77 fields available for 25 would be reduced, and 49 would not be affected by the cut.

The critical nature of the runway situation has to be illustrated by examining the 31 fields now in use for four-engine airplanes,



PUBLIC RUNWAYS AND TAXIWAYS

Los Angeles County regional planning commission is studying proposed for public dedication of runways and taxiways, because of diminishing number of landing facilities in high density population areas. Such a public conveyance is envisioned in sketch, prepared by Col. William J. Fox, commission's chief engineer. Building development in adjacent areas is shown in shaded portion of sketch, Fox suggests.



NAVION IN BUSINESS

Three advertising agency executives piloted by Rex Harrod, Perry, H., outlined Navion distribution, via North American Navion in business contacts with speed otherwise available. Kathleen & Kathleen's radio director Larry Karpis, promotional manager Robert Schoenfeld and C. D. Kattana left Chicago at 10 AM, held lunchtime conference 172 mi away at Michigan City and returned for Chicago conference that afternoon.

but which have runways less than the six-foot equivalent of 4,000 ft. There were 24 of these fields included in the original improvement program. On the basis of Harriman's statement none of these would be dropped, some were reduced in scope, with the only one of the 12 unchanged. Three of these are unimproved but are proposed under the Class IV and larger program, so would not be affected by the Congressional piling of the \$65,000,000 in question.

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FUEL, HEAT AND TIME

High-Power Dusters Operated in Idaho

Because of the high altitudes of its fields in Idaho, the 13 duster-pilot pilots who fly the Farm Land of Boise, the power in their airplanes.

So Land, who operates in Farm Land Corp. Custer, Ind., has eight Boeing PT-17 biplane trainers, which need to have 225 hp Continental engines in powerplants, and has more than doubled the power. The replacement powerplants in the PT-17s are not surplus like the plane dusters. They are 440 hp Pratt & Whitney Wasp Jr. engines, some of them obtained in surplus PT-17s which sold complete at less than \$300.

Total cost of the high-powered duster is estimated at less than \$1500 exclusive of special equipment and NX and NX licensing.

Shortened engine mounts were necessary for the engine change, and the engine had to be removed so that the duster pilots have to spin the propeller by hand to start the engines, a considerable task on a 440 hp engine.

Steve Land selected this equipment a year ago, he has lost another plane or pilot, a record against the hazardous profession, which is additionally dangerous at the higher altitudes of his area. But with extra power, it is not unusual for a pilot in his one of the 440 hp Boeing duster out of a cow pasture with 900 ft of COY above, and clear a 75 ft row of trees with room to spare, little more than 3,000 ft from the island point.

The extra power has saved the dusters with no serious accidents when their down-to-earth flying caused them killed by Hanes Mitchell, chief pilot, as reports on the plane which hit a tree was thrown into trees. Hanes, Idaho, and every one and after flying mountainously, pulled up on full throttle and flew out beyond west propeller ends and more rate and burst on the fuselage and wings the plane was damaged and he was killed flying without report. Other planes of the same type have crashed in much in the first end of the tops of trees with their propellers, and more without but pilots for about 30 years along a canal bank, without serious harm to the plane. Mitchell duster was one of all of these planes, but points out that the low altitude flying sections for certain types of duster, under such conditions almost unavoidable occasionally.

Paul Montgomery, manager 24 pilots as low, with the Wasp Jr. but the fields a major battle, the land a will may not the additional safety for the pilot, after this experienced need, to make the plane the most economical that Land has operated from an airfield near a highway and a considerable distance.

in completing operations with smaller high-powered dusters, which will become a year and in dusters which have powered aircraft have proven expected.



MORE POWER TO A DUSTER—Farm Land, Boise, Idaho, used crop duster, has a fleet of surplus PT-17 Boeing primary trainers, which he actually classifies as the best dusters in the world since he has replaced them with 440 hp Continental engines with 440 hp Pratt & Whitney Wasp Jr. engines, more than doubling the horsepower. One overhaul of plane and engine costs less than \$1500 due to surplus power except for the special wheel equipment. Photos show: slow up of a repaired fuselage with Chief Pilot Hanes Mitchell getting up, and the short takeoff made possible by the extra power (Bob Armit photos).

Florida Airport Licenses

All private airports in Florida must apply for their first annual license by July 1, in accordance with the regulations adopted under the state's new airport licensing act which went into effect the first of this month. About 95 airports were under the act.

For the first year will be \$10 for fifth road for commercial operations, and \$10 if used only by owner or tenant. The \$10 is the maximum permitted by the law, and the State Improvement Commission, which administers the act, hopes no subsequent years that figure can be cut in half. For establishment of a new airport, an extra \$10 will have to be paid as a site approval fee.

After Aug. 1, no airport may be established without approval of the commission and the field must be personally inspected by a representative of the Commission before it can be licensed. After the July 1 deadline, no plane can take off from or land on an unlicensed airport except in case of emergency.

Plane Registration Gains

Canada had 72 private planes registered at the end of 1946, it has been declared by the first time by the Department of Transport.

Forest Spraying Program Successfully Completed

Largest aerial spraying program in the Northwest, covering 413,600 acres of forest in Oregon, Washington and Idaho, has been one of the most successful of its type, federal authorities report.

Plans and supervision of Central Air South Corp., Kansas, Wash., and Johnson Flying Service, Minn., Mo., undertake the project jointly. The operation will be complete approximately 324,000 at a contract rate of 35 cents an acre.

When the aerial spraying is completed, it is expected that the spraying had failed to do close any trace of living taroach, the worst pest against which the spraying at track was aimed.

100th Florida Airmarker

Florida has completed restoration of the 100th anniversary of the 1846 it had before wartime aviation required legislation.

In explaining that it would require \$500,000 and \$100,000 to secure all of the medals, State Aviation Director W. C. Luzzatto reported that Sen. Claude Pepper had notified the support of congressional delegations from 10 states for a bill which would reimburse states for awards or delivered by the federal government during the war.

Should the bill of enactment before the amendment of Congress, an effort may be made to reduce the greater summing expense through the cost of claims.

Cessna Model 170

Cessna Aircraft is going ahead with development of its Model 170, a four passenger, high-wing personal plane which it hopes to market under \$5,000. It will be powered by a 150 hp engine and its size will be half way between the 140 and 195. Decisions to continue came after a market survey revealed many customers looking for a four place plane with the 150-200 hp engine. Engineers say only it will be a total of 10,000 airplanes.

Ryan Begins Navion Parts Distribution

Ryan Aeronautical Corp., San Diego, was to start handling open bids today for work for the new plane Navion parts plant, with expectations that the company would be in production at San Diego in the latter North American plane within two to three months, probably by October. Until that time deliveries will be made from finished planes in stock at North American's Southern Boulevard.

Job of manufacturing tooling and materials purchased from North America by Ryan to the San Diego plant will require about 500 12 ton truck loads and will not be completed until September. Production runs at Ryan and North American have been working for several weeks plus along the border and the Navion production line at Ryan which is expected to have a 10 plant in the region.

Navion Parts Plant—T. C. Ryan, president, said that the Navion production plant would be used but plant has been studied for strengthening and extending facilities.

The new Ryan will be moved to its new plant in the latter, but future advertising and promotion making will still be at the plant at the "Ryan Navion". The new advertising agency which has handled the Navion since its inception—Bertin, Berlin, and Co., Oklahoma—expected to be retained, with Robert Schneider as account executive. The Navion promotion will continue to stress the plane's features, and a slogan "Navion: The Plane That Moves America" will be used in the initial phases of the Ryan advertising program.

No Basic Changes—Ryan and his pilots and engineers had made a thorough study of the Navion and recommended that it be the last engine treatment be made. Some design refinements may be expected as customer preference is more firmly established, but the basic design is so advanced that it will be needed for an extended period of time.

Lanier Named as CAA Training Head

Appointment of Fred M. Lanier, assistant director of CAA safety regulations, as director of CAA Aeronautical Center, Olathe, Kansas City, training center for CAA personnel, was announced by Washington department in a release for the "old press" in the Federal agency.

Lanier was one of the strongest opponents to efforts for abolishing the CAA regulations governing the private pilot during his term as safety regulations director from October 1970 until last September. He was transferred at that time to Atlanta as regional CAA administrator.

Effect of the Lanier appointment on the training at the CAA requires personnel will depend largely on how much actual responsibility and authority his new position holds. Since much of the CAA regulations involves a matter of interpretation by the individual inspector or other official, the training of that official is almost as important as the interpretation of the rules as they affect the pilot, maintenance, operation, and construction, and so on have a direct effect on the other regulatory work.

Other CAA personnel shifts announced simultaneously with the Lanier appointment.

William M. Robertson formerly senior assistant administrator for foreign operations, moved to current Lanier at Atlanta. (Robertson's foreign operations post was derived from the interest of economy, with employees transferred to other duties or reported them away.)

F. W. Davis, was advanced to executive assistant to T. T. Wright, Administrator of Civil Aeronautics, following F. W. Davis, usually named a deputy administrator. Davis has been program planning officer, was associated with Consolidated Veterans and other aircraft companies in engineering and administrative work before coming to CAA in 1964.

Both Robertson and Lanier have been with CAA and previous agencies since 1953, joining the Department of Commerce as aeronautical inspection in that year.

Airport Liquor Poll

Kalamazoo, Michigan Commission is polling other airport management throughout the country to find out how many airports actually license or other alcoholic beverage vending machines, and what their experiences with the business have been.

The poll followed application of Lee Harley, airport assistant manager, for information to open a cocktail lounge in addition to the restaurant. County Liquor Board has expressed the opinion that nothing stronger than beer could be sold under the provisions of the state liquor law, since the report is outside the Indianapolis city limits.

Airport Increase

A sizable jump in both registered aircraft and airports during the past 12 months is reported by CAA, with a jump from 80 percent increase in airports, and a rate of about 38 percent in airports.

Aircraft and airports (figures as of June 1)	1947	1948
Aircraft in Operation	5,074	6,356
Commercial	1,163	1,718
Municipal	1,612	1,888
CAA, Fairchild	189	311
Military	660	827
All Others	130	174
Total Registered Aircraft	62,145	72,499
Scheduled Air Carriers		
Aircraft	585	647

Asks Helicopter Amendment

Amendment of a city ordinance which prohibits the landing of helicopters within the city limits and a restriction of its number which would prohibit operations in airports belonging from designated spots in Buffalo have been asked of the Buffalo airport authority board by Larkins F. Fennell, assistant to the president of Bell Aircraft Corp.

Fennell stated Buffalo now is "the only large city in the world where landing within the city limits is completely prohibited."

"This is a strange provision," he said. "We are the only city in the world where of helicopter manufacturers in Buffalo are not the landing prohibited, but also there is no one who can grant permits in the case of other cities."

Mr. Fennell explained: "We don't want immediate landings, but we do feel there should be specific spots where helicopters could land."

Hawaii Air Director

Robert L. Campbell has been named director of operations for Hawaii's new Aeronautics Commission effective July 1. Campbell, vice president and general manager of the Aviation Trust Service, Ltd., will take over duties now performed by Leslie J. Watson, manager of airports for the territorial department of public works. That agency is having its aviation functions over to the state commission.

Appointed commission members are Glen T. Becker, chairman; G. J. Barrett, vice chairman; Ralph Hoads, secretary; Chas. W. E. Whitman and W. A. Anderson. They assumed duty July 1. Campbell was assistant airport manager at San Francisco Airport and airport engineer for the Bureau of Air Commerce in seven western states before moving to Hawaii in 1966.

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Sales and Service Operations Started

► **Anthony Maguire, Inc.**, a Y. Y. commercial pilot and airplane service operator at Chautauque Lake, has moved to a new hangar located by Bushnell Drive north of Jackson, Ariz., on the new road from a seasonal airport operation. The hangar, valued at \$150,000 is part of the former American Airlines Co. installation, valued at a total of \$1,150,000.

► **Lynbrook Flight Service, Inc.**, Weymouth, N. H., has been successful with \$25,000 capital stock, by A. E. Taylor, Jr., H. M. Deal and Kayford Deal to operate airplanes for transportation.

► **United Airm Services, Inc.**, Charlotte, N. C., has been appointed distributor of Cessna Aircraft Co.'s aviation electronics equipment.

► **Randall Brothers Aircraft, Inc.**, has been chartered at Wichita, Kan., with national capital of \$274,000 to construct a flying school, to be operated by the company, to provide facilities for complete aircraft sales and service, maintenance, charter and flight instruction. Gene Randall was doing solo student work.

► **Wilsons-Falkland Flying Co.**, New York, has been chartered with 200 shares on a par stock capital, for purpose of one training aircraft pilots by operating from private. Subscribers are Anne and Stuart Sperry, 375 West End Ave., New York, and Helen Sperry, 365 West 43rd St., New York.

► **Wilsons and George Norbury**, former Navy and Army pilots respectively in World War II, have opened a camp during summer in the Bahamas, West End, using two Tiger Cubes based at the Bahamas airport.

► **Thomas Tress, Inc.**, Milwaukee, has opened a location at airport in North Waukegan, using a 21-1000000 DC-3 which carries two passengers a weekend from Milwaukee to Rhineclaire and Lind O Lakes, with charter trips during the remainder of the week. Arthur Blakes, director of the airport, has announced.

► **Lynbrook Flight Service, Inc.**, Weymouth, N. H., has been chartered with \$150,000 either and capital stock, with Marvin Parrot, Jr., Edward King and John Parrot as subscribers.

► **Wynne Flight Service**, operated by Alvin M. White at Brownsville, Tex., has leased the Union, Texas, municipal airport for exclusive operation. White plans to erect steel hangars and establish a flight school for GI training.

► **James P. Jones, Inc.**, Princeton, Pa., and Idaho, pilots have contracted with the U. S. Forest Service to fly daily patrols over the Crown D/Alone natural forest the summer using a Stinson Voyager and a Piper Super Cub, logging out for forest fire.

BRIEFING FOR DEALERS AND DISTRIBUTORS

AIRKREFT PROPOSERS WIN—Appropriation by the Milwaukee Common Council of \$250,000 for improvement of the city's downtown landing strip, Marquette Field, was a definite victory for the chosen airport proponents, and means that Marquette Field will be used as landing facility for the next 18 years at least, which should be long enough for it to demonstrate its ability. Francis Treder, businessman, flyer, and leader in the fight to prevent the landing from being used as a harbor adjunct, reports ground will be broken on improvements including a pond 3,200 ft. across and a helicopter landing area, at a cost of \$245,000. A parking lot \$300,000 for the project is obtained.

JOB FOR ENGINEERS—James Lindner, safety expert for Aero Insurance Underwriters, says that insurers and designers should have a target for three designs of proposed planes to demonstrate 65 percent of the total accident, since only 35 percent of fatalities are attributable to careless flying. The risks are critical to insure from accident compensation in human life, preventing and avoiding. The engineer's handwriting, however, he is trained to be analyzed and control, and growth of increasing human beings to be human. The third measure, says Lindner, that the average person for whom he designs a plane or engine, represents, helps him to maintain pilot proficiency, and is not concerned in carrying out standard insurance judgment in operation of mechanical equipment. "The engineer's job should be to make it as possible for the user to do the minimum required to operate the present-day plane safely."

AERONAUTIC SALES REPORT—Ed Price, Aeronautic Properties manager, Baltimore, reports delivery of 2,137 of the variable guide propellers in the first six months of 1947. Model P-380, the best sold for 55 to 140 engines, was sold in order of quantity for the Piper Super Cub, Stinson Voyager 150, Bonanza Cub, Ercoupe, Stearman, Beech, North and Fairchild P-24. Model 232, a largest set for 155 to 240 hp engines was sold at the Norman and Fairchild, and also on the Grumman Wildcat and Republic P-48. Foreign Aeronautic sales include an order for 115 Model 232s for use by the Danish fleet of Fins and the French Air Force. The French Air Force has ordered 100 Model 232s for the 140 hp, four-cylinder Bonanza, an order by the Swedish, Swedish Air Force for the complete 121 hp by Link, and an order from the Chinese Air Force for Aeronautic ground adjustable propellers for Boeing airplane engines.

DEALER INTEREST—Furner Cohen dealer and distributor, and other airplane sales organizations are showing considerable interest in the production of the Monarch Aircraft Company planes designed by Al W. Monarch, former top pilot in charge of engineering for Culler. Since publication of the first picture of the plane in *Aircraft News*, about 50,000 inquiries have been received. The only complaint now in preparation for the production, the model M-18, is second to what Monarch received a large sum of money. The company has already decided that the plane can be marketed for less than \$1,500 if it won't sell. A moderate quantity of M-18s for distribution, will provide any full production quantity, at the new Monarch location near the Grumman-Walton plant, on a recently purchased 10-acre tract, where a group of small hangar-type buildings will be erected.

MORE PLANES FOR GAITHER—Kort, Ore., which has an adult population of 36, has six pilots and six airplanes in total use on an on-call delivery, and has four flight facilities with additional ones planned by individuals. Kort says will have the highest plane per capita than any community in the nation, since the national rate is one plane for each 1,000 persons. Topical of the leading facilities is that of George Wilcox, who knows the town as he has been employed there, now rather the highway as a tail fin alongside his business and living.

STINKING MARKS PLAYWAVE—An exhibition of a recent Stinson dealer sales conference at the Wayne, Mich., Elmer Plant, during January 21, Stinson Voyagers and Flying Station, Wagon, in the largest area delivery in the company's history, for airplanes in 15 states. More than 250 persons attended the dealer meeting at which William A. Rice, Consolidated-Vulture representative in charge of sales, and William H. Kleins, Jr., Stinson plant sales manager, were principal speakers. The company has new 155-2000 and other service facilities in that country and overseas, and is continuing to sell all of its products as fast as the planes are manufactured, Kleins reported.

SEARCHES IN WILDLIFE SERVICE—U. S. Fish and Wildlife Service of the Interior Department has taken delivery on three Republic Sportcrafts, for use as Alaska Patrol D-1. D. C. Fishery, veteran Alaska pilot of the Service, led the party. The plane was the first plane they will be used for fish and game protection, poaching law enforcement, survey, game and bird counts and preliminary search control. Each plane will carry two men and approximately 100 lb. of camping and emergency equipment with full tank, and will be able to cover 400 miles of flying time, for example, in a single day, taking the place of at least 20 power boats and their crews, Fremont, Mont., was told.

Alexander McQuay

AIR TRANSPORT

Transport Category Seen Facing General Revision

Lands expresses dissatisfaction with present slide-rule calculations governing take-off weight; urges consideration of human, other factors.

Present estimates by CAA Chairman James M. Lands indicating his own opinion and criticism of the highly controversial transport category of the Civil Air Regulations have not passed unnoticed lately.

Between actual pilots and aeronautical engineers on transport changes proposed by the President's special air safety board, Lands is the chairman of the special board.

Revisions recommended by the board would result in greatly reduced payloads for fast engine equipment using 4,000 ft. runways, and 50 percent increase in the peak take-off loads at the standard rates.

► **Pilot Complaints**—While airline pilots, engineers and the CAA have been battling over the transport category since 1935, public hearings on the special board's suggested changes offered the last opportunity to grasp Lands' position on the subject.

Lands indicated dissatisfaction with the slide-rule engineering calculations on which the transport category is based because they did not sufficiently emphasize the human factor under adverse conditions and other factors that drive an aerial equivalent as concerned with air traffic conditions. Lands also indicated he was not satisfied with current methods regarding determination and enforcement of the category procedure.

► **Human Factor**—Referring to the accuracy of adding the human factor to engineering calculations, Lands cited the recent crash of a United Air Lines DC-4 off the end of runway 18 at La Guardia Field.

"As I listened to the testimony, that plane should have gotten off. There was nothing wrong with the engine. Full take-off power was being applied, and suddenly, I got up thinking the accident hadn't occurred. That is bad and that is what we want to see. As I listened to the scientific testimony that accident didn't happen—but it did. That is why I say there is a certain value in looking at normal behavior under such conditions."

Lands also indicated his thought steps-and-schedule distances were calculated too heavily on the basis of a federal man whose reaction was assumed to be fixed.

► **Temperature Factor**—One of the things the aviation men are likely to find demands the computing conditions-and-air

space is whether it really fits. I can see that from a scientific standpoint it is all right but does not fit what human beings do."

Lands indicated concern over testimony that very degree of temperature over 59 degrees Fahrenheit had the effect of adding 700 lb. to the take-off weight of a DC-4.

► **DC-4**—CAA ALPA member of the special board, pointed out that under the present transport category when temperature is not considered in a three-step 59 degrees a DC-4 loaded with 50 passengers taking off at a temperature of 59 degrees has to either add a passenger saving or everybody's lap and seat must be in the air.

► **Engineer Questioned**—CAA asked Dr. W. B. Oswald, chief of aerodynamics at Douglas Aircraft Co., to testify before the special board. Lands said Oswald's testimony was not to be used by the board as a basis for any such recommendations.

"If that is the way airplanes are operated corresponding to a 100 degree day I don't say that. I would be sorry about taking off. I could become upset at higher temperatures but I feel that the present transport category has clearly intended to be up to about 59 degrees."

Lands commented: "The public would be considerably disturbed if on a 59 degree day the class opens and 50 passengers were allowed to fly. But actually at a physical fact CAA pilots do not think the same thing happens by adding the temperature 40 degrees. We don't allow the airplane to be loaded that way at 59 degrees by adding a 100 lb. passenger but at 59 degrees the airplane from a take off standpoint is loaded nearly the same way as if you had an additional passenger on every seat and it is in the air."

► **Thomas Passengers**—CAA said I look at the temperature then. Lands reported, "I see these same passengers climbing on three airplanes in the transport, two give up and it is not too comfortable a flying."

Discussing Charles Deane, assistant chief of CAA safety regulations on take-off weight limitations, Lands said: "Am I not disturbed by the problem of enforcement then?"

"No Sir," Deane answered, "I think the



WEATHER INFORMATION BOARD

Time-consuming personnel regarding weather have been advised substantially at United Air Lines' report terminals and disseminate traffic offices through installation of 25 or 30 information boards showing conditions at 17 key points on coast's system. As left in CAA's third report about which many hypotheses exist regarding current temperature, cloud conditions, and data on whether rain, snow or fog exists. Information appearing on report comes in by teletype at the intervals from CAA's operations department.

EAL, C & S and PCA Agreements Create Pattern for Pilots' Pay

ALPA makes substantial gains in three recent contracts; negotiations involving other carriers now underway; feeders also may have to agree to wage increases.

Development of a pattern for domestic pilot pay agreements is seen in a new Capital Airlines (CA) contract which follows closely the recent pacts negotiated by Eastern Air Lines and Chicago & Southern Air Lines.

While these three agreements, in which both DC-4 and DC-5 captains and pilots won substantial wage boosts, the Air Line Pilots Association's habit of specifying pilot pay procedures seems to have been broken for the time being.

► **Previous Action**—The TWA emergency board recommendations (July, 1946) were based on recommendations by ALPA in January, 1947, when TWA threatened along the strike of the previous October. In a March, 1947, agreement with American Airlines, ALPA threw out the TWA award as a precedent in the first bid overhauling of the Decade 51 pay formula since its origin in 1934. With the EAL agreement of last May, the American Airlines precedent was, in turn, shown completely dropped. Now C&S and Capital have taken note with the Eastern pay formula and pay scales so that a pattern for the industry may, at last, have been established.

The EAL pattern before the old Decade 51 flight hour pay scale for captains and co-pilots was based on \$10 and \$17.50 an hour for flights between \$50 and \$75 per hour. This followed suit with the TWA emergency board recommendations and the TWA Chicago arbitration award on flight hour pay and is better than the flight hour scale agreed to by American. As in the EAL and C&S agreements, the Capital emergency board recommendation gives captains of all types of aircraft base pay ranging from \$12,500 for the first year to \$15,000 in the beginning of the eighth year.

► **Base Scale**—This is the most basic pay item avoided in the TWA Chicago pilot union in captains of DC-4 and Constellation in domestic service and in the same at the base pay in the present American agreement. It is \$70 a month higher than the old Decade 51 formula which is still standard for airlines with whom ALPA has not completed current negotiations.

A number of additional moves, including flight, national, winter, Mal Coast, East, United, Pan American, Northwest, Frontier, Colonial and American Overseas, are negotiating with ALPA. Since four airlines (EAL, C&S and PCA) have increased the rate for DC-4 pilots at the same time they agreed to rates for larger aircraft, it can be expected that ALPA will

be able almost all the certificated career down to the contract for more pay. Whether this will extend to the newly certificated pilots, was designed to pay the Decade 51 scale is a matter for speculation.

► **Formula**—The new pay for Capital (no with EAL and C&S) keeps the same minimum of 100 miles formula which has frustrated many companies of airline pilots' pay. Captains get 1 cent a mile for the first 1,200 per month over the 100 mile limit and 14 cents for additional "vacation miles" out to exceed 10,000.

The major departure from precedent in the Capital, C&S and EAL agreements is the weight differential of 11 cents per flight hour for each 1,000 lbs. of maximum certificated gross weight for a given type of plane. This amounts to \$1.24 per flight hour for both EAL and C&S DC-4 captains but only about \$1.20 for PCA captains, under the latter's DC-4s are listed at 43,000 lb. compared with 73,000 lb. for the other two airlines.

► **Differential Established**—American was the first to institute a weight differential in pilots' pay but did it by establishing three flight hour pay scales, one progressively higher for aircraft with gross weight under 10,000 lb., 10,000 to 150,000 lb., and 150,000 to 150,000 lb.

Under PCA's formula, an eight year DC-4 captain, flying 60 hours a month, full day and half night, will receive monthly \$12,000 base pay, 16,000 flight hour pay, \$1,612 mileage pay and \$1,055.40 weight differential pay for a total of \$13,266.40. This compares against a speed bracket for the DC-4 of 300-315 mph and an average speed of 285 mph. On the same basis, an EAL captain would receive \$11,120 base because of the greater gross weight of an EAL DC-4.

► **Best for Co-pilots**—Co-pilots for PCA, C&S and EAL on service of all types will receive \$104 monthly for the first six months to \$148 monthly at the beginning of their fifth year of service. This is \$64 a month over the old scale before four engine aircraft were widely used, \$30 a month higher than the co-pilot scale agreed to by ALPA and American, and \$73 a month higher than the TWA Chicago award for DC-4s in domestic service. Present co-pilot pay scales on PCA, C&S and EAL, entered with other ALPA demands for DC-4 pay in domestic operations which were substantially higher. ALPA wanted \$15,500 annually from American (proposal of Oct. 5, 1945) and

New Labor Law

While genes covered by the Rail way Labor Act an example, laws must provisions of the new Taft-Hartley Act, the most direct to which the labor unions without employees and employers is still somewhat distant. This is not the case, however, of the law as an equivalent or restriction for political campaigning. The political expenditure action of the new law is in the form of an amendment to the George Washington Act, and there is no language in the record which would exempt unions and railroad unions.

Before money can be affected by the Taft-Hartley Act in other ways, some many of them, like the labor national Association of Mechanics and the UAW, have one of thousands of members outside the rail roads and airlines who are clearly covered by the new legislation. This means these unions, in order to keep their rights under the Taft-Hartley Act, must be required to use financial methods of conducting their activities, and they will have their labor relations that they are not connected and do not involve overtime of the Government by force.

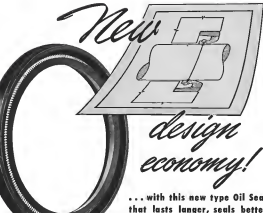
\$15,500 from TWA (proposal of Dec. 1, 1945). These figures are based on 80 hours per month, full day and half night, although ALPA made the maximum demand less by proposing a 75 hour monthly flight limitation.

► **Flight Hour**—Capital—ALPA, last December, in TWA, for captains of DC-4 (single day) in domestic service, before the strike of October and November last year, amounted to \$1,274 monthly for 60 hours, full day and half night. This compares with \$1,000 monthly recommended by the TWA emergency board and \$1,016 monthly awarded as a result of the TWA Chicago arbitration.

With American now paying \$1,215 monthly to eight year DC-4 captains and EAL, C&S and PCA paying only a few dollars less, ALPA has come close to winning the pay scale asked of TWA before the strike. In addition, ALPA has now substantially increased for DC-3 co-pilots and captains.

Tigers Flying Atlantic

Along Tiger Line has completed its first year C-54 charter trips to Europe and pilots to make additional trans-Atlantic flights this summer. Company will assign more C-54s both for world wide contract operations and to replace its C-47s on transcontinental cargo runs. Two C-54s are now on hand



Oil Seal Seals were developed by John-Manville to prevent seal leakage in our fighting planes during World War II. Their superior advantages as an oil seal were thoroughly tested and proved. Now they are available for the entire industry to provide the same efficient, long term bearing protection.



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Consisting of a rigid bed and a tough but flexible lip molded into a single unit, Clippel Seals provide an exceptionally long wearing oil seal with superior lubrication-retaining, anti-sealing qualities. They are easily installed and may be removed without damage. Non-corrosive, they are also resistant to most forms of corrosion.

Clippel Seals are made to fit any size shaft from 3/8" diameter up. For further information, write John-Manville, Box 292, New York 14, N. Y.

CAA Pilot Study Nearing Completion

The CAA-sponsored psychological study on selection, training and upgrading of airline pilots—now being conducted by the University of Pittsburgh's Aerospace Institute for Research—is vital for aviation by the end of August.

Working with CAA funds, Institute researchers have conducted interviews at 28 sites with airline pilots, company check pilots and CAA air carrier inspectors to obtain examples of pilot behavior in critical situations, pilot ideas on improving methods of checking proficiency, and information on the causes and effects of pilot fatigue. Other sources of data have been CAA records of examinations for new pilot ratings, company records on successful and unsuccessful pilots, and CAA accident reports. Names of individuals are not being used.

Results of the project are expected to include a statement of the more important attributes required of a pilot, improvements in the curriculum for airline transport pilot rating, and a report that will make available the benefits of the experience of hundreds of airline pilots in critical situations.

Radioactive Elements Flown From Oak Ridge

The 1,000th shipment of short-lived radioactive isotopes dispatched from the atomic discharging pile at Clinton Laboratories, Oak Ridge, Tenn., was carried from Knoxville, Tenn. to Washington, D. C., by Aerofast Airlines, Inc. aircraft.

Because the primary of the radioisotopes (used in medical and biological research throughout the country) is of exceptionally brief duration, 40% of the 1,000 consignments from Oak Ridge have been made by plane and the remainder by rail express. The program began in August, 1946, but was not publicized until this month.

In the case of the radioisotopes now listed as the 1,000th shipment, potency is believed to be 14 days. Other radioisotopes with exceptionally short "half-lives" which have been dispatched by plane include strontium-90, radioiodine, sodium iodide, ruthenium and ruthenium chloride. These isotopes are believed to have half-lives of 14 days, 32.4 hours, 14.5 hours, 5 days, 26.8 hours and 34 hours, respectively.

PAA Mail Pay Set

Two American Airlines will receive \$2,372,000 for carrying and between the U. S. and Alaska and mail between the Alaska for the period Aug. 1, 1946, to Dec. 31, 1946. The payment set by CAA is the equivalent of 98.16 cents a plane mile and will give PAA an operating profit of \$382,765—a 7 percent return on the carrier's investment in the Alaska route.

NEW AVIATION PRODUCTS

Berk Bandwood FluidPack Props

Production is now underway on FluidPack, new four-bladed propellers manufactured by Berk Aircraft Co., Kent County Airport, Grand Rapids, Mich. Initially scheduled for use on Cessna 120 and 140, Beechcraft Voyager and Stinsons, and



Lycoming G5 and G5, propeller will also soon be available for Piper, Cessna, and other craft. Made of Berk Bandwood or five laminations producing 17,000 r.p.m. and plus, FluidPack is rated to give increased strength and longer life. Motor repairs it has had, about double propeller which is especially resistant to rust, carb, and pine lesions. Pinned to compare's standard stainless steel locking edge.

New Valmet Controlled Rains

New development in rain sensing equipment for pilots and flight control operation is Valmet-controlled Rainfall, made by Valmet, Inc., Minneapolis. Set is stated to make heavy down, rain, release



control permitting landing down of heavy rain. Set is transfer in design to a doctor's stethoscope, having new type of basket rain meter than earlier class over head. Unit is extremely light weight, being made of Tantalum.

Costs Abnormal: Agent's Correction

New simple and rapid method for curing abnormal agent's abnormality is announced by American Chemical Plant Co., Andover, Pa., which has developed special product, Abnorm, for use on both plastic and suspended abnormality workers. Makes this new electric chemical process produces superior

type coating. Inherently protected only with acidic treatments. Material may be applied by either spray or mechanical methods to aircraft or aircraft parts, and is both cost and safe maintenance. In this Abnorm process, a thin, tough film gradually materialized with the metal is formed by introduction of the aluminum and chemicals, resulting in surface which is resistant to shock loading, and charring.

For Aircraft Engine Field Checks

Terminal pilot for checking aircraft status in the field is now Model 214 self-contained battery operated electronic voltmeter which eliminates need of plugging into an ac line. Motor Electric Electronic Instrument Co., 10509 Dayton Ave., Cleveland 5, Ohio, states that the instrument and voltage test unit will not be affected from aircraft

When Pulling Stomach

The left side of the stomach is surrounded in a series of spiral ridges in aircraft models since they, once down a spiral in the left side of the stomach pulling. One



men on sports left by first pulling which close of ground, then closing left about line and releasing. Device will handle single or double test from 6.10 to 14.00, Model 214, Lark, Inc. Equipment & Supply Co., 2190 West Division St., Cole.

Electricity for Gas Welding

Improvements are reported in new all-position electrode developed primarily for use in welding such secret assemblies as landing gear, engine mounts, and other parts requiring great strength. Designed by JSA, electrode is now available in 1/8, 1/4, 3/8, and 1/2 in. diam. Models, Wilson, Welding & Machine Co., 61 E. 42nd St., New York City 17, states that with this electrode the necessity for preheating is removed when welding high strength steels. Only about 100 degrees F. is required to weld with the JSA unit and capable in cracking on when preheating is not employed. Since weld metal is more ductile, cracks attemptable in a past as approximately 150,000 psi when the product metal is heated to 1,000 deg. F., quenched in oil and drawn at 600 deg. F. for 1 hr.

Stinson Gives Dealers "A Solid Foundation For A Profitable Business"



Leslie H. Bowman, Fort Worth, Texas, who backs his Stinson operations with 50 years' experience in aviation.

Meet Leslie Bowman, whose current sales volume is running 200% above his record for '46!

Ranked as one of the pioneers of personal aviation, Leslie Bowman looked the field over before he signed with Stinson.

Today he writes: "Thanks to the experienced management, the proved engineering, and the alert

sales policies of Stinson, we have a solid foundation for a profitable business. We have real utility planes to sell—4 place 'Nysayers' planes of quality that attract and hold the kind of owners every airplane dealer wants."

Bowman's widely-known Aircraft Sales Company, Fort Worth, Texas, now represents an investment of \$103,000. It employs 60 people. It is currently doubling—and might even triple—its high sales volume of '46.

That's long-range career business. Profitable business with a real future to it!

Stinson has some additional opportunities waiting for operators who can qualify—and who want action! For complete details, write or wire William H. Klenke, Jr., General Sales Manager, Stinson Division, Consolidated Vultee Aircraft Corporation, Department G, Wayne, Michigan.



Complete facilities of the Aircraft Sales Company include a retail store, fully stocked with parts, accessories, and ground flying equipment.



\$325,000 investment—and still growing! At Fort Worth's famous Mescalito Field, Aircraft Sales Company maintains complete aircraft, engine, radio, and propeller shops. In the foreground are four Stinson—America's most useful personal planes—easy to fly, easy to buy—easy to sell!

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Flyin' high—and lasting longer because they're Ampco extruded bronze

Wear-resistant aircraft parts cost less
when machined from Ampco extruded stock

Exceptionally high strength-to-weight ratio is an indispensable asset for aircraft parts. This quality is one of seven outstanding performance advantages of Ampco aluminum bronzes — advantages which give better and longer service for vital parts subject to wear in any application.

Extra economies are afforded when you can use Ampco extruded bronze rods. Extruded stock works faster than cast or more requirements — reducing waste and machining time, the smooth finish and compact structure can down friction caused by physical flaws.

Two grades of Ampco Metal and two grades of Ampcoalloy (industrial bronzes) are regularly produced as extruded forms by Ampco. Rods in a complete range of sizes are available for immediate shipment. Write for Bulletin 644 for complete details.



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- Strength • Wear • Excellent bearing qualities
- Efficiency in reducing maintenance

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(Continued from page 62)

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reproduced in the spirit of the original. It is a
complete and complete reference for all the
information needed by the Searchlight Section.

PETTY LITTLE MEN

Another powerful group has rebuked the Civil Aeronautics Administration, this time the Hinshaw Committee of the House of Representatives.

How long, oh, how long must aviation be hamstrung by a handful of CAA Civil Service seat warmers whose petty jealousies and politics overpower any spirit of public service?

Their industry is in defending the mistakes which out, in denying those not yet proved. Their ambitions are to retain their powers as best they may, regardless of the public good.

Their pride is in showing the world they are impervious to outside experience and knowledge; and that they will have their own short-sighted ways by whatever means they can devise.

Their technical inferiority is equalled only by the woeful lack of any spirit or understanding of progress.

Although their number is probably not over 15 or 20, they are holding down to their own level scores of other capable and well-intentioned men in CAA. CAA in turn is retarding every phase of commercial aviation.

How long, oh, how long, will these little men continue to have their own way?

ROBERT H. WOOD

STEEL IMPROVEMENT FORGED TURBINE BLADES ARE ALWAYS Dependable



It was clear to Steel Improvement Engineers, at the initial stage in the application of jet propulsion to aircraft, that the forging of turbine blades, buckets and wheels would require something beyond traditional forging techniques. There followed the immediate adoption of an attitude in which the urge to pioneer, to persist in the effort to discover and establish correct techniques for forging high temperature alloys to close tolerances, was given the utmost limitation of action. According to the irrefragable urge to forge correctly these essential parts, funds were generously appropriated to the beginning to obtain or develop suitable equipment and to conduct experimental forgings. Success crowned this effort. Thousands of these vital parts have been forged of the new high temperature alloys by deep forging to close tolerances. On the basis of long experience in forging aircraft designs, and of the specialized metallurgical and engineering skill required, it is now possible for Steel Improvement Forging Engineers and Metallurgists to: (1) know the exact forging technique that should be utilized for developing fully the qualities inherent in the alloy, and are required to meet the high stresses occurring in modern aircraft engines; (2) avoid costly experimentation in forging, heat treating and machining blades, buckets and wheels; (3) advise and assist designers regarding the correct placement of parting lines and other design elements; and (4) adhere strictly to a policy of producing a pressure only when the accomplishment of the work can be substantiated by fact or experience or both.

THE VITAL ELEMENT IN THE IMPROVEMENT OF METALS BY FORGING IS MEN!

Backed by over 25 years of forging production experience, Steel Improvement Engineers and Metallurgists have under their direction complete facilities for performing the highly specialized work of forging, heat treating and machining turbine blades, buckets and wheels of high temperature alloys. These facilities constitute a Turbine Forgings Division, the authority and responsibility of which encompasses all required phases of engineering, metallurgy, production and inspection to ensure you dependable forgings.



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LONG *but* LIGHT!

You're looking down the length of the upper cargo section of the Boeing Strato-freighter, the new YC-97 Army Cargo plane—one of the newest aircraft to be equipped with G-E fluorescent lamp ballasts. Ever since General Electric started supplying this equipment for aircraft, our specially designed ballasts have been used on all types of planes. These ballasts are designed for altitudes up to 50,000 feet, temperatures from minus 70 C to 71 C and are capable of withstanding severe shock and vibration.

Like all other General Electric aircraft equipment, these ballasts are lightweight, and have been carefully tested at our own flight test laboratory. G-E precision-built products for aircraft range from tiny switchettes and relays to generators, motors, and jet engines. Completely engineered systems automatically do many jobs that ordinarily require much time and attention from pilot, engineer, and other crew members. Our specialists will gladly work with you to help you determine the right electric equipment for your job. Just call the nearest G-E office. *Aviation Divisions, Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



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